THE GENUS *XEROCOMUS*

A personal view, with a key to the British species

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In the past the genus *Xerocomus* has been an assemblage of convenience, consisting of the type species *X. subtomentosus* and a range of further species of broadly similar appearance and morphology. There is as yet no widespread agreement on the criteria that should be used to separate *Xerocomus* from *Boletus*; my own method is given below. Here I do not intend to complicate things further, as it is far better to leave such things to the molecular experts. So the scope of this key is very much based on personal views.

Only species that I consider to be true *Xerocomus* are included. For this key I delimit the genus by the following: when a specimen of *Boletus* is cut in half, a single tube can be removed from the sectioned cap using fine tweezers; with *Xerocomus* this is not possible. Obviously this will not apply to *X.* (= *Phylloporus*) *pelletieri* which has a lamellate hymenium. For recording purposes however, individuals should use whichever generic name they are comfortable using, remembering that the recent British checklist follows Watling & Hills (2005) and thus only uses *Xerocomus* for species that have never been combined in *Boletus*.

This key was first introduced at the BMS *Boletus* workshop in July 2007. I have used the synoptic type key which Geoffrey Kibby used successfully for his *Leccinum* key (Kibby, 2006), (I have always said "If you want a key written, ask Geoffrey"). I hope this one works as well as his, if it does I will be happy. I have found that most people, but not all, prefer a synoptic key to the standard dichotomous type as it is far easier to return and reconsider your specimen if you feel the results are incorrect.

Of the 18 species included, two are recently described from my own British collections (*X. chrysonemus*, *X. silwoodensis*). Two others have yet to be found in Britain: I believe *Xerocomus fennicus* will probably be found somewhere in Scotland, whilst the soon to be described *X. guidonis ad. int*, until recently thought to be the North American species *X. dryophilus,* has now been recorded in Italy, Croatia, France & Spain. It appears to be moving slowly north and the hotter summers in Britain might induce fruiting here.

Some of the species are rare! Or are they? If you live in the south of England most are fairly easy to find. If you live in the north it is even more important to record *Xerocomus* species, as we have very few records for some species.

The characters I have chosen to use are fairly simple: cap colour and whether cracking occurs, followed by context (flesh colour). Next the colour of the mycelium (remember to look at the mycelium on site): yellow or golden are the unusual ones. With stipe surface I have not used colour, only surface texture; this is followed by host tree. It is very important to look up and try to identify the host tree. This is not necessarily the nearest one, poplar (*Populus* species) for example is never easy to spot, since the trees are often very slender and tall. However the leaves on the ground are easier to spot when foraying, so get used to looking out for them. The final character, regrettably, usually requires measurement of the spore width.

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Other species sometimes treated in *Xerocomus*.

There are two species that have been treated as *Xerocomus* at different times and which are not included in these keys:

• *Boletus pulverulentus*

This species is one that people collect on forays and often think is a *Xerocomus*. It does resemble one and was combined in *Xerocomus* by Gilbert (1931). However, when cut through it immediately turns intensely dark blue throughout; when young this change is very striking becoming less intense with age. No *Xerocomus* gives such a strong blueing reaction.

• *Boletus impolitus*

At times people have mistaken this species for a large *X. subtomentosus* and it is

Fig. 1. *Xerocomus armeniacus*, a much misidentified and distinctly rare species in the UK. Photograph © Alan Hills.

Fig. 2. *Xerocomus bubalinus* a little-known species growing with *Tilia* and *Populus* in urban areas, has recently been added to the British list. The photograph shows its characteristic pink flushing of the cap flesh. These specimens, found in Silwood Park, Berkshire, 2007 were the first British collection. Photograph © Alan Hills.

included in *Xerocomus* in Ladurner & Simonini (2003). Apart from its robust stature and floccose stem, the principal character is a medicinal smell of iodine at the stipe base when cut; this can be strong to weak and very occasionally not present. The colour change of the cut flesh is also distinctive in that it clearly becomes pale yellow on the outer edges while remaining pale off-white elsewhere.

Before using this key, please read through the notes on pp. 80-81.

I have tried to simplify this key by avoiding using chemicals (results can be inconclusive), and have used six field characters, only the spore shape and size needing to be checked microscopically. Compare your specimen with each key character shown below and choose ***one*** from each group, i.e. if you have a greenish cap use C and choose ***one*** tree host and so on.

Cap colour

Please read the notes, don't just use the pictures which are merely indicative.

Mycelium colour

This is important in *Xerocomus* identification, especially for the three species with yellow or golden mycelium, all of which have non-cracking caps.

Flesh colours

Cut a fruitbody in half so the flesh is exposed from cap to base of stipe. Time (up to 10 minutes) should be allowed for changes to occur.

If uncertain about a character then note the alternative choices and try both. Finally check the species descriptions at the end of the key. **Note that some key entries have square brackets** ⌐ , these are where two different species can give identical codes. In such cases please see the additional notes on these species following the descriptions on page 95.

Since *Xerocomus pelletieri* is so easily distinguished by its unique character it is keyed out first for convenience.

1. Hymenophore (spore-bearing surface) formed of soft, blunt yellow gills with prominent cross veins ....***X. (= Phylloporus) pelletieri***
- Hymenophore of typical boletoid tubes and pores.....***go to Synoptic key***

Fig. 3. *Xerocomus chrysenteron* showing its characteristic red, punctate stem and pale flesh which eventually stains red in the stipe cortex. Collection from under conifers in Kew Gardens, October 2006. Photograph © G. Kibby

SYNOPTIC KEY TO POROID *XEROCOMUS* SPECIES

KEY CHARACTERS – SELECT *ONE* LETTER FROM EACH GROUP

1. Cap colour

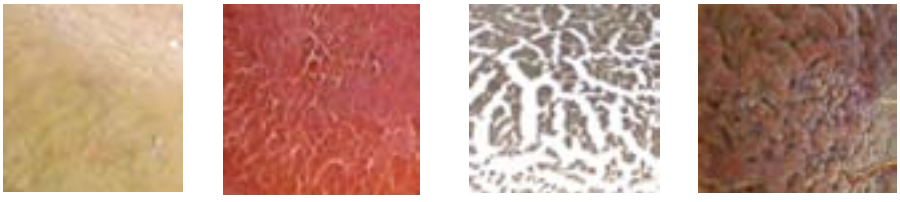
A – Mostly red or pink tones to all red.
B – Mid brown caps, showing reddish, pinkish or apricot tones tones towards the outer edge.
C – Olive to olive brown – greenish. Without red or pink tones.
D – Olive brown to mustard – without red or pink tones.
E – Yellow to yellow-brown – without red or pink tones.
F – Mid brown range to brown – without red or pink tones.
G – Very dark brown to almost black – without red or pink tones.

A **B** **C** **D** **E** **F** **G**

Colours above are only a rough guide to colour range.
Please read the colour descriptions above before choosing.

2. Cap surface

H – Virtually smooth.
I – Usually ± cracking; this may be a very small amount in a young fruitbody, check carefully.
J – Rugose.



H I ← ± → I J

3. Context colour and/or colour change on cutting

K – White to off-white, changing little.
L – Starting white, but later showing pinkish or purple hues in cap area.
M – Off-white, cream to yellow or a mixture of these colours.
N – Carrot colour present in the stipe base, often only as minute dots.
O – Becoming ± blue in part or over much of the full area. This blueing change may take some time.
P – Developing only a trace of blue.
Q – Developing a ± reddish or pinkish flush in stipe or cap.

4. Basal Mycelium

(If mycelium is not present the very base of the stipe can give a good indication)

R – Mostly white to off-white. In ageing specimens some small amount of pale yellow may be present at the extremities, this should be ignored.

S – Pale cream
T – Pale yellow
U – Yellow
V – Deep golden yellow

5. Stipe surface

W – Strongly striate, at times appearing as a network.
X – Weakly to very weakly striate.
Y – Punctate.
Z – Smooth to the naked eye (though somewhat fibrillose when viewed with a hand lens).


W


X


Y


Z

6. Host tree

a - *Salix, Alnus*
b - *Betula*
c - *Castanea*
d - Conifers
e - *Fagus, Carpinus, Tilia*
f - *Quercus*
g - *Populus*

7. Spore type

h - Truncate - *make sure spores are taken from a spore-print.*
j - Broadly ellipsoid – *go to Xerocomus moravicus.*
k - Rather broad – average width more than 5µm.
l - Rather narrow– average width less than 5µm.


h


j


k


l

Vol 9 (3) Note: all possible tree and spore codes are shown, in practice only ***one*** will apply

Species code	Species	No
AHMRZ-ef-k	guidonis	10
AHORZ-ef-k	guidonis	10
AHQRZ-ab-h	fennicus	8
AHQRZ-ef-k	guidonis	10
AHORZ-ef-k	guidonis	10
AIKTZ-cf-k	armeniacus	1
AIMSX-cf-k	rubellus	16
AIMSY-cf-k	rubellus	16
AIMSZ-cf-k	rubellus	16
AIMTZ-cf-k	armeniacus	1
AINSX-cf-k	rubellus	16
AINSY-cf-k	rubellus	16
AINSZ-cf-k	rubellus	16
AIORX-def-l	cisalpinus	6
AIORY-def-l	cisalpinus	6
AIORZ-afg-l	riparielllus	15
AIORZ-def-l	cisalpinus	6
AIPSX-cf-k	rubellus	16
AIPSY-cf-k	rubellus	16
AIPSZ-cf-k	rubellus	16
AIPTZ-cf-k	armeniacus	1
AIQRZ-ab-h	fennicus	8
AIQRZ-afg-l	riparielllus	15
AIQSX-cf-k	rubellus	16
AIQSY-cf-k	rubellus	16
AIQSZ-cf-k	rubellus	16
AJQRZ-ab-h	fennicus	8
BHLSZ-eg-l	bubalinus	3
BHMRZ-ef-k	guidonis	10
BHORZ-ef-k	guidonis	10
BHMUY-def-k	pruinatus	14
BHMUZ-def-k	pruinatus	14
BHOUY-def-k	pruinatus	14
BHOUZ-def-k	pruinatus	14
BHPSZ-eg-l	bubalinus	3
BHPUY-def-k	pruinatus	14
BHPUZ-def-k	pruinatus	14
BHQRZ-ab-h	fennicus	8
BHQRZ-ef-k	guidonis	10
BHORZ-ef-k	guidonis	10
BHQSZ-eg-l	bubalinus	3
BIKTZ-cf-k	armeniacus	1
BILSZ-eg-l	bubalinus	3
BIMRX-bcdef-k	communis	7
BIMRY-bcdef-k	communis	7
BIMSX-bcdef-k	communis	7
BIMSY-bcdef-k	communis	7
BIMSY-de-kl	chrysenteron	4
BIMSZ-de-kl	chrysenteron	4
BIMTZ-cf-k	armeniacus	1
BIMUY-def-k	pruinatus	14
BIMUZ-def-k	pruinatus	14
BINRX-bcdef-k	communis	7
BINRY-bcdef-k	communis	7
BINSX-bcdef-k	communis	7
BINSY-bcdef-k	communis	7
BIORX-def-l	cisalpinus	6
BIORY-def-l	cisalpinus	6
BIORZ-afg-l	riparielllus	15
BIORZ-def-l	cisalpinus	6
BIOUY-def-k	pruinatus	14
BIOUZ-def-k	pruinatus	14
BIPRX-bcdef-k	communis	7
BIPRY-bcdef-k	communis	7
BIPSX-bcdef-k	communis	7
BIPSY-bcdef-k	communis	7
BIPSY-de-kl	chrysenteron	4
BIPSZ-de-kl	chrysenteron	4
BIPSZ-eg-l	bubalinus	3
BIPTZ-cf-k	armeniacus	1
BIPUY-def-k	pruinatus	14
BIPUZ-def-k	pruinatus	14
BIQRX-bcdef-k	communis	7
BIQRY-bcdef-k	communis	7
BIQRZ-ab-h	fennicus	8
BIQRZ-afg-l	riparielllus	15
BIQSX-bcdef-k	communis	7
BIQSY-bcdef-k	communis	7
BIQSY-de-kl	chrysenteron	4
BIQSZ-de-kl	chrysenteron	4
BIQSZ-eg-l	bubalinus	3
BJMUY-def-k	pruinatus	14
BJMUZ-def-k	pruinatus	14
BJOUY-def-k	pruinatus	14
BJOUZ-def-k	pruinatus	14
BJPUY-def-k	pruinatus	14
BJPUZ-def-k	pruinatus	14
BJQRZ-ab-h	fennicus	8
CHKTW-bcdef-k	ferrugineus	9
CHKTX-bcdef-k	ferrugineus	9
CHKTY-bcdef-k	ferrugineus	9
CHKUW-bcdef-k	ferrugineus	9
CHKUX-bcdef-k	ferrugineus	9
CHKUY-bcdef-k	ferrugineus	9
CHKVW-f-k	chrysonemus	5
CHKVX-f-k	chrysonemus	5
CHMRW-bdef-k	subtomentosus	18
CHMRX-bdef-k	subtomentosus	18
CHMRZ-bdef-k	subtomentosus	18
CHPRW-bdef-k	subtomentosus	18
CHPRX-bdef-k	subtomentosus	18
CHPRZ-bdef-k	subtomentosus	18
CHQRW-bdef-k	subtomentosus	18
CHQRX-bdef-k	subtomentosus	18
CHQRZ-bdef-k	subtomentosus	18
CIKTZ-cf-k	armeniacus	1
CIMRW-bdef-k	subtomentosus	18
CIMRX-bdef-k	subtomentosus	18
CIMRZ-bdef-k	subtomentosus	18
CIMSX-cef-j	moravicus	11
CIMSZ-cef-j	moravicus	11
CIMTX-cef-j	moravicus	11

Species code	Species	No	Species code	Species	No
CIMTZ-cef-j	moravicus	11	EHMRZ-bdef-k	subtomentosus	18
CIMTZ-cf-k	armeniacus	1	EHPRW-bdef-k	subtomentosus	18
CIPRW-bdef-k	subtomentosus	18	EHPRX-bdef-k	subtomentosus	18
CIPRX-bdef-k	subtomentosus	18	EHPRZ-bdef-k	subtomentosus	18
CIPRZ-bdef-k	subtomentosus	18	EHPSZ-eg-l	bubalinus	3
CIPTZ-cf-k	armeniacus	1	EHQRW-bdef-k	subtomentosus	18
CIQRW-bdef-k	subtomentosus	18	EHQRX-bdef-k	subtomentosus	18
CIQRX-bdef-k	subtomentosus	18	EHQRZ-bdef-k	subtomentosus	18
CIQRZ-bdef-k	subtomentosus	18	EHQSZ-eg-l	bubalinus	3
DHKTW-bcdef-k	ferrugineus	9	EILSZ-eg-l	bubalinus	3
DHKTX-bcdef-k	ferrugineus	9	EIMRW-bdef-k	subtomentosus	18
DHKTY-bcdef-k	ferrugineus	9	EIMRX-bdef-h	porosporus	13
DHKUW-bcdef-k	ferrugineus	9	EIMRX-bdef-k	subtomentosus	18
DHKUX-bcdef-k	ferrugineus	9	EIMRZ-bdef-h	porosporus	13
DHKUY-bcdef-k	ferrugineus	9	EIMRZ-bdef-k	subtomentosus	18
DHKVW-f-k	chrysonemus	5	EIMSX-cef-j	moravicus	11
DHKVX-f-k	chrysonemus	5	EIMSZ-cef-j	moravicus	11
DHMRW-bdef-k	subtomentosus	18	EIMTX-cef-j	moravicus	11
DHMRX-bdef-k	subtomentosus	18	EIMTZ-cef-j	moravicus	11
DHMRZ-bdef-k	subtomentosus	18	EIORX-bdef-h	porosporus	13
DHPRW-bdef-k	subtomentosus	18	EIORZ-bdef-h	porosporus	13
DHPRX-bdef-k	subtomentosus	18	EIPRW-bdef-k	subtomentosus	18
DHPRZ-bdef-k	subtomentosus	18	EIPRX-bdef-k	subtomentosus	18
DHQRW-bdef-k	subtomentosus	18	EIPRZ-bdef-k	subtomentosus	18
DHQRX-bdef-k	subtomentosus	18	EIPSZ-eg-l	bubalinus	3
DHQRZ-bdef-k	subtomentosus	18	EIQRW-bdef-k	subtomentosus	18
DIMRW-bdef-k	subtomentosus	18	EIQRX-bdef-h	porosporus	13
DIMRX-bdef-k	subtomentosus	18	EIQRX-bdef-k	subtomentosus	18
DIMRZ-bdef-k	subtomentosus	18	EIQRZ-bdef-h	porosporus	13
DIMSX-cef-j	moravicus	11	EIQRZ-bdef-k	subtomentosus	18
DIMSZ-cef-j	moravicus	11	EIQSZ-eg-l	bubalinus	3
DIMTX-cef-j	moravicus	11	FHKTW-bcdef-k	ferrugineus	9
DIMTZ-cef-j	moravicus	11	FHKTX-bcdef-k	ferrugineus	9
DIPRW-bdef-k	subtomentosus	18	FHKTY-bcdef-k	ferrugineus	9
DIPRX-bdef-k	subtomentosus	18	FHKUW-bcdef-k	ferrugineus	9
DIPRZ-bdef-k	subtomentosus	18	FHKUX-bcdef-k	ferrugineus	9
DIQRW-bdef-k	subtomentosus	18	FHKUY-bcdef-k	ferrugineus	9
DIQRX-bdef-k	subtomentosus	18	FHLRX-g-k	silwoodensis	17
DIQRZ-bdef-k	subtomentosus	18	FHLRY-g-k	silwoodensis	17
EHKTW-bcdef-k	ferrugineus	9	FHLSX-g-k	silwoodensis	17
EHKTX-bcdef-k	ferrugineus	9	FHLSY-g-k	silwoodensis	17
EHKTY-bcdef-k	ferrugineus	9	FHLSZ-eg-l	bubalinus	3
EHKUW-bcdef-k	ferrugineus	9	FHLTX-g-k	silwoodensis	17
EHKUX-bcdef-k	ferrugineus	9	FHLTY-g-k	silwoodensis	17
EHKUY-bcdef-k	ferrugineus	9	FHMUY-def-k	pruinatus	14
EHKVW-f-k	chrysonemus	5	FHMUZ-def-k	pruinatus	14
EHKVX-f-k	chrysonemus	5	FHORZ-dfe-l	badius	2
EHLRX-g-k	silwoodensis	17	FHOSZ-dfe-l	badius	2
EHLRY-g-k	silwoodensis	17	FHOUY-def-k	pruinatus	14
EHLSX-g-k	silwoodensis	17	FHOUZ-def-k	pruinatus	14
EHLSY-g-k	silwoodensis	17	FHPRZ-def-l	badius	2
EHLSZ-eg-l	bubalinus	3	FHPSZ-def-l	badius	2
EHLTX-g-k	silwoodensis	17	FHPSZ-eg-l	bubalinus	3
EHLTY-g-k	silwoodensis	17	FHPUY-def-k	pruinatus	14
EHMRW-bdef-k	subtomentosus	18	FHPUZ-def-k	pruinatus	14
EHMRX-bdef-k	subtomentosus	18	FHQSZ-eg-l	bubalinus	3

 Note: all possible tree and spore codes are shown, in practice only ***one*** will apply

Species code	Species	No
FILSZ-eg-l	bubalinus	3
FIMRX-bcdef-k	communis	7
FIMRX-bdef-h	porosporus	13
FIMRY-bcdef-k	communis	7
FIMRZ-bdef-h	porosporus	13
FIMSX-bcdef-k	communis	7
FIMSX-cef-j	moravicus	11
FIMSY-bcdef-k	communis	7
FIMSY-de-kl	chrysenteron	4
FIMSZ-cef-j	moravicus	11
FIMSZ-de-kl	chrysenteron	4
FIMTX-cef-j	moravicus	11
FIMTZ-cef-j	moravicus	11
FIMUY-def-k	pruinatus	14
FIMUZ-def-k	pruinatus	14
FINRX-bcdef-k	communis	7
FINRY-bcdef-k	communis	7
FINSX-bcdef-k	communis	7
FINSY-bcdef-k	communis	7
FIORX-bdef-h	porosporus	13
FIORX-def-l	cisalpinus	6
FIORY-def-l	cisalpinus	6
FIORZ-bdef-h	porosporus	13
FIORZ-def-l	cisalpinus	6
FIOUY-def-k	pruinatus	14
FIOUZ-def-k	pruinatus	14
FIPRX-bcdef-k	communis	7
FIPRY-bcdef-k	communis	7
FIPSX-bcdef-k	communis	7
FIPSY-bcdef-k	communis	7
FIPSY-de-kl	chrysenteron	4
FIPSZ-de-kl	chrysenteron	4
FIPSZ-eg-l	bubalinus	3
FIPUY-def-k	pruinatus	14
FIPUZ-def-k	pruinatus	14
FIQRX-bcdef-k	communis	7
FIQRX-bdef-h	porosporus	13
FIQRY-bcdef-k	communis	7
FIQRZ-bdef-h	porosporus	13
FIQSX-bcdef-k	communis	7
FIQSY-bcdef-k	communis	7
FIQSY-de-kl	chrysenteron	4
FIQSZ-de-kl	chrysenteron	4
FIQSZ-eg-l	bubalinus	3
FJMUY-def-k	pruinatus	14
FJMUZ-def-k	pruinatus	14
FJOUY-def-k	pruinatus	14
FJOUZ-def-k	pruinatus	14
FJPUY-def-k	pruinatus	14
FJPUZ-def-k	pruinatus	14
GHMUY-def-k	pruinatus	14
GHMUZ-def-k	pruinatus	14
GHOUY-def-k	pruinatus	14
GHOUZ-def-k	pruinatus	14
GHPUY-def-k	pruinatus	14
GHPUZ-def-k	pruinatus	14
GIMRX-bdef-h	porosporus	13
GIMRZ-bdef-h	porosporus	13
GIMUY-def-k	pruinatus	14
GIMUZ-def-k	pruinatus	14
GIORX-bdef-h	porosporus	13
GIORZ-bdef-h	porosporus	13
GIOUY-def-k	pruinatus	14
GIOUZ-def-k	pruinatus	14
GIPUY-def-k	pruinatus	14
GIPUZ-def-k	pruinatus	14
GIQRX-bdef-h	porosporus	13
GIQRZ-bdef-h	porosporus	13
GJMUY-def-k	pruinatus	14
GJMUZ-def-k	pruinatus	14
GJOUY-def-k	pruinatus	14
GJOUZ-def-k	pruinatus	14
GJPUY-def-k	pruinatus	14
GJPUZ-def-k	pruinatus	14

Fig. 4. *Xerocomus chrysonemus*, a recently described species growing with *Quercus* and showing its characteristic bright yellow mycelium at the stipe base. Photograph © Alan Hills.

Fig. 5. *Xerocomus cisalpinus* with particularly red caps and showing the strong blueing reaction often seen in damp conditions. Photograph © Alan Hills.

Fig. 6. *Xerocomus fennicus*, looks very similar to some forms of *X. cisalpinus* (Fig. 5) and *X. ripariellus* (Fig. 9) but has truncate spores and was described from Finland. It has not yet been found in the UK but might be expected to occur in Scotland. Photograph © Andy Taylor.

Fig. 7. *Xerocomus ferrugineus* with white flesh and velvety cap cuticle. Note the punctate ridges on the stipe apex. Photograph © Alan Hills.

Species Descriptions

Key to icones cited:

(C&D) *Mushrooms & Toadstools* – Courtecuisse & Duhem.

(FM) *Field Mycology*

(FE8) *Xerocomus. Fungi Europaei 8* Ladurner & Simonini. (2003)

(HE) *Schmier- und Filzröhrlinge s. l. in Europa.* Engel, H., Dermek A., Klofac, W., Ludwig, E., (1996).

(RG) *I Boleti* – Roberto Galli 1998.

(RP) *Mushrooms* Roger Phillips 1981.

1. *X. armeniacus* (Fig. 1)

PILEUS 30-100(200) mm mostly finely tomentose, somewhat hemispherical to convex; striking apricot in young fruitbodies, which soon become a vibrant cherry to rich red, later fading to drab pinkish orange, ± cracking and showing pale lemon flesh below. **PORES** large, somewhat irregular in outline, lemon-yellow fading to yellowish green with age, blueing with pressure. **STIPE** 40-90 x 10-18 mm; never smooth, very slightly striate (using a hand lens). More or less equal, bright rich yellow at the apex, becoming concolorous with the cap toward the base. **MYCELIUM** light pale yellow to pale yellow. **CONTEXT** ivory to cream within the cap, with a pinkish to date-coloured indistinct line below the cuticle, a small amount of blueing in some examples, more yellow in the stipe with little sign of any blueing. **SPORES** 11.6-13.9(15.2) x 5.0-5.8 µm. **PILEIPELLIS** of non-gelatinized, long, simple, flexuous hyphae of variable length. 3.7-10.8 µm in diam with often shortened penultimate cells, many bearing congophilous plaques unique to this species.

HABITAT usually with *Quercus* or *Fagus*, but also conifers, distinctly southern in England.

NOTES: to date only two proven collections in UK herbaria, but it has probably been misidentified in the past and recorded as *X. rubellus*, see Hills & Kibby (2005). A drop of FeSO4 on the context at the stipe base produces a strong green-blue reaction. This species should not be claimed without verifying the presence of plaques which stain with Congo red, attached to the pileipellis hyphae (illustrated in FM 6(3):99, 2005).

Icones: (C&D) page 427. (FM) Vol 6(3) 98-9. (FE8) page 513. (HE) page 215 & 217. (RG) page 115.

2. *X. badius*

Syn.: *X. badiorufus?*

PILEUS 35-130 mm, bay, chestnut or dark brick-colour becoming flushed ochraceous brown. Minutely to distinctly tomentose when young, especially at the margin, soon becoming smooth and polished, becoming viscid in wet weather. **PORES** angular, large, dull, pale lemon-yellow becoming flushed with pale sulphur-yellow, blueing with pressure. **STIPE** 45-125 x 8-40 mm at base, cylindrical when young becoming somewhat clavate with age, concolorous with cap or slightly paler above, minutely flocculose at the apex to halfway, becoming fibrillose striate throughout with age and darkening where handled. **MYCELIUM** off-white to cream yellow. **CONTEXT** white or lemon-yellow becoming azure blue, particularly around the tubes and in the stipe apex, not greening, vinaceous in cap tissue. **SPORES** 11.2-14.7 x 4.3-5.1 µm subfusiform in side view, ellipsoid in face view **PILEIPELLIS** a thick, interwoven layer of cylindric, hyaline to dark brick-coloured gelatinized hyphae, mostly smooth, others fairly strongly ornamented, 3.5-13.2 µm broad with end cells either undifferentiated or slightly shortened, but not significantly swollen.

HABITAT a common species in the UK with a variety of hosts, found mostly with conifers or *Fagus*.

NOTES: the viscid cap is unique in British *Xerocomus*.

Icones: (C&D) page 427. (HE) page 233. (RP) page 196.

3. *X. bubalinus* (Fig. 2)

Syn.: *Boletus populinus*

PILEUS 20-80 mm, buff, pale to dark yellow-brown or pale brown, usually with a pink flush appearing towards outer edges, tomentose when young, later becoming very smooth (in dried state almost shining smooth, particularly at the centre), with the surface often cracking and showing yellowish, sometimes locally pink-flushed flesh.

PORES bright yellow when young, with age becoming dark (greenish) yellow or sometimes brownish and then somewhat orange brown, bruising (dark) greenish blue. **STIPE** at apex concolorous with pores, but also with a pink flush or stripes (pink tending to disappear in old specimens), elsewhere striped with dark yellow brown or (dark) brown on a yellow to pale yellow-brown background, very dark brown in old specimens. **MYCELIUM** pale cream (this is based on the only British collection to date). **CONTEXT** in cap whitish to very pale yellow, in upper part of stipe pale yellow-brown, darkening towards base, turning bluish above the tubes and pinkish in the rest of the cap or sometimes vice versa, sometimes blueing at stipe apex adjacent to tubes, rarely blueing in rest of stipe. **SPORES** 10.1 - 14.2 x 4.3 - 5.2 µm. **PILEIPELLIS** an irregular trichoderm, often with branching elements in upper part and usually rather pointed terminal cells, (5.5) 7.0-18.0 (27.0) µm broad. Subterminal cells (5.5) 7.0-18.0 (27.0) µm broad; moderately strongly pigment-encrusted and (100) 150-210 (260) µm long.

HABITAT the only proven specimen in the British Isles was found in parkland near Ascot, Berkshire. European collections are all from parklands with *Populus* and *Tilia.*

NOTES: this species can easily be mistaken for *X. communis* but can be distinguished by the lack of orange spots in the stipe base, its narrower spores and tendency to flush pink and blue in the cap flesh.

Icones: (HE) page 181.

4. *X. chrysenteron* (Fig. 3).

PILEUS 40-100(200) mm, convex, hemispherical to applanate; tomentose, then smooth, initially with or without purplish tints then pale sepia, less frequently paler or ochreous, ± the entire cap or only the disc cracking into irregular patches and revealing pale flesh (not red); slug or rodent etc damage healing coral. **PORES** large, angular, sulphur-yellow to lemon-yellow, slowly bruising bluish green. **STIPE** 40-100 x 10-25 mm, equal or tapered upwards, lemon-chrome or lemon-yellow at apex, scarlet or red from the middle downwards, ornamented with more or less conspicuous, red, blood-red or carmine floccose granules, more buff towards the base, with ± weak striations. **MYCELIUM** pale cream, a dirty white with age. **CONTEXT** cream to straw-colour or lemon-yellow in cap, usually more brown or reddish buff in stipe, very rarely turning slightly blue in places particularly above the tubes and in stipe base but then only slowly, finally reddish buff, blood-red in the stipe cortex; **SPORES** 11.8-16.6 (20.7) x 4.8-6.8 (8.5) µm subfusiform in side view, ellipsoid in face view, variable, average 13.6 x 5.7 µm, pale straw-colour in NH4OH, only slightly darker in Melzer's reagent. **PILEIPELLIS** an erect palisade of chains of strongly encrusted, short, ellipsoid cells up to 20 µm long, with zebra-patterned ornamentation.

HABITAT mostly found with conifers but also under *Fagus* (in a form under *Cedrus* the caps are much darker and the stipe can be very pale, almost white when young). As now defined, not known to fruit with *Quercus*.

NOTES: considered to be a very common species before the publication of *X. cisalpinus* where many of the earlier records probably belong.

Icones: (C&D) page 427. (FE8) page 522. (HE) page 199. (RP) page 204.

5. *X. chrysonemus* (Fig. 4)

PILEUS 25–70mm diam, convex becoming applanate, at times plano-concave. Initially finely tomentose becoming glabrous with age, margin inrolled when young; greyish golden-yellow or becoming more golden-yellow after collecting, often very variable in colour, mustard to olivaceous yellow, fulvous, with age becoming darker, sepia, sienna with a hint of red–brown or toward rich copper in damp weather, somewhat mottled in the centre, colour uniform around margin. **PORES** cadmium yellow when young with closed pores, soon butter yellow then amber yellow with age, becoming large and angular, unchanging with pressure. **STIPE** 30–50 x 5–18 mm, slender when young, becoming ± fairly robust, generally distinctly tapered, with a strikingly bright yellow appearance when very young, resembling the pores, soon toning down, finally dull straw with a minute foxing of reddish brown flecks, striate, at times the flecks forming an incomplete, stretched

reticulate pattern. **MYCELIUM** deep golden-yellow to mustard-yellow. In water-saturated collections the mycelium looks yellow, but becomes more golden yellow after drying. **CONTEXT** off-white to pale lemon yellow in the pileus, brighter yellow in the stipe to golden at the very base, vibrant in very young fruitbodies. Unchanging with cutting or bruising. **SPORES** smooth, ellipsoid, to ± broadly subfusiform, thick-walled, (9-) 11.5 (-14.5) x (4.5-) 5 (-7) µm, Q = 2.1–2.3. Spore deposit olive brown. **PILEIPELLIS** somewhat intricate trichoderm of fairly short cells 4.5–18.0 mm diam, having little or no ornamentation, some at times branching, end cells rounded to bullet-shaped, rarely tapering, ± disarticulating.

HABITAT associated with *Quercus* in shady positions. Fruiting in damp, well-rotted leaf litter in small hollows in the forest floor, or on moss-covered shaded banks. Soil pH approx. 7.

NOTES: recently described (Taylor *et al*., 2006), to date found only in Britain (Hampshire, Kent and Buckinghamshire). Field identification can be by the bright golden mycelium and the intense yellow context on cutting. It could be mistaken for *X. moravicus* when young, in later stages it somewhat resembles *X. ferrugineus*.

Icones: Taylor *et al.* (2006).

6. *X. cisalpinus* (Fig. 5)

PILEUS 40-85 mm, highly variable, commencing hemispherical to convex, later flattened; tomentose, shades of hazel, olive, snuff-brown, soon becoming finely areolate, revealing a reddish-pink subpellis. **PORES** angular, rather uneven in many mature examples, when bruised becoming slowly weakly blue. **STIPE** 45-85 x 4-10 mm, equal or wider at the apex, at times slightly bulbous at the base; yellow at the apex becoming reddish punctate below, but the yellow can at times continue throughout the full length. Appearing fibrillose under a hand lens, ± strongly blueing when handled, more so when wet. **MYCELIUM** white. **CONTEXT** pale yellow in the cap quickly fading to off white, ± blueing. In the stipe deep yellow to paler yellow, showing some reddish colour in part, slowly blueing, strongly at times over the complete stipe, in others only in part, at times red only at the base. **SPORES** 11.4-14.7(16) x 4.5-5.7 (6.3) µm, subfusiform in side view, ellipsoid in face view, longitudinally striate, (difficult to observe under an optical microscope). **PILEIPELLIS** of erect cylindrical hyphae in chains, these encrusted in most instances with the exception of the terminal cells that only at times show full complete encrustation, these end cells never constant in the amount of swelling or tapering, varying between 4.6-18.3 µm in diameter.

HABITAT usually with *Quercus* but also with other broadleaf trees. Common and probably distributed throughout the UK.

NOTES: maggot tunnels show red-brown in context. This species, like *X. pruinatus*, contains large thick-walled ± amyloid hyphae in the stipe base. These are found by staining fragments in Melzer's reagent for some minutes, after which they are washed out in chloral hydrate solution removing all Melzer's, and mounted in clean chloral hydrate solution. Before being described in Peintner *et al.* (2003), it formed part of the overall concept of *X. chrysenteron*.

Icones: (FE8) pages 481-489 & 521. (HE) plate 35 described as *X. chrysenteron forma gracilis*.

7. *X. communis*

Syn.: *Xerocomus quercinus* (never validly published), *Xerocomus declivitatum*.

PILEUS 30-70 mm rarely up to 110 mm, convex, soon becoming hemispherical then flat to plano-convex. Drab grey when young, then pale olivaceous buff, olivaceous brown to ironstone-colour, developing mixtures of pinkish to pale red hues in narrow marginal zone, sometimes covering whole cap surface or a mixture of colours persisting. At times minutely cracking to reveal pallid flesh below, especially under dry conditions. **PORES** very small, looking closed when young, with age large and angular, so large that the rust-brown spores can often be observed within the tubes, slightly blueing with pressure. **STIPE** 30-70 x 5-15 mm, stocky when young, becoming slender with age, pale yellowish with a faintly rose-pink pruinosity at apex, dotted with carmine either throughout or in middle section over background colour of rich yellow brown to old gold, finely striate-fibrillose, bruising only slightly with

pressure. **MYCELIUM** dull white to pastel yellow. **CONTEXT** pale yellow in cap, blueing immediately above the tubes, slightly deeper yellow in stipe and more or less showing purple-red below stipe cuticle; usually with few to many minute bright orange dots in the stipe base (use a hand lens), these sometimes coalesce to give a bright orange flush to much of the stipe base, often maggot-ridden. **SPORES** 10.3-14.3 (15.5) x 4.1-6.4 (7.1) µm, average 12-13 x 5-6 µm, subfusiform to subcylindrical in side view, elliptic in face view. **PILEIPELLIS** a trichoderm of short erect hyphae 7-17.2 µm broad some swollen, but majority tapering to a rounded point or bullet-shaped, with zebra-patterned encrustation.

HABITAT common in parks and gardens as well as open woodland sites, often with *Quercus* but also with other tree species.

NOTES: close to and confused with *X. rubellus* (Ladurner & Simonini (2003) incorrectly treated it as a synonym) which always starts out very red then soon fades (especially when exposed to sunlight) to shades of olivaceous-brown with a ± pinkish tinge in the centre. [The British Check List includes this species as *Boletus declivitatum*, see editorial notes p. 74].

Icones: (FE8) page 519, as *X rubellus.* (FM) Vol 3(3) page 82 & 98. (HE) page 207 & 209, as *X. quercinus*.

8. *Xerocomus fennicus* (Fig. 6)

Syn.: *Boletellus fennicus*

Not yet recorded in the UK

PILEUS 10-70 mm, convex to plane, at first bright red, fading from the centre to brown with age with some red areas persisting at the margin, soon distinctly cracking with the centre remaining unbroken. **PORES** normally rather large, bright yellow, almost round to angular. **STIPE** 20-50 x 5-15 mm, red as pileus but paler at the apex, becoming ± brown with age. **MYCELIUM** white to dirty white. **CONTEXT** yellowish white, strongly blueing with pressure. **SPORES** 10.1-15.5 x 3.8-6.3 µm, truncate at one end and faintly striate. **PILEIPELLIS** elements smooth to heavily encrusted, some bearing plaques that do not stain in Congo red.

HABITAT associated with *Betula* and *Alnus*.

NOTES: described from Finland as *Boletellus fennicus* in Harmaja (1999), who earlier confused this species with *X riparielus.* Collected since then from Austria and Sweden. Easy to identify thanks to its truncate spores. I expect the species to be found in Scotland soon and for this reason I have included it in this key.

Icones: (FE8) pp 440-441.

9. *Xerocomus ferrugineus* (Fig. 7)

Syn.: *Boletus spadiceus, Boletus leguei, Boletus citrinovirens, Xerocomus subtomentosus* var. *ferrugineus*

PILEUS 15-105 mm, velvety to suede-like with a tomentum that is reddish brown, apple- or herbage-green, olivaceous yellow or olive-green to dark brown, but which soon collapses to form darker areas; green forms may have ochraceous and lemon-yellow spots which disappear leaving the cap date-brown to snuff-brown, flushing deeper bay to dark brick-colour where bruised. **PORES** angular, large and somewhat irregular in outline, rich lemon chrome fading to yellowish green with age, sometimes blueing with pressure. **STIPE** 50-100 x 10-36 mm (to 50 mm at base in some collections), slender to occasionally fairly robust, often appearing bent, cartilaginous and cracking with broken ends often bending back. Buff to drab yellow background more or less spotted ferruginous over entire length, at times with flecks forming an incomplete stretched reticulate pattern, less frequently forming distinct ribs. **MYCELIUM** yellowish, never bright yellow. **CONTEXT** white to ivory, unchanging, cream to straw colour only above tubes, cinnamon-buff line beneath cap cuticle, at times silvery in stipe apex and often mottled with clay-pink or even greyish blue in stipe apex, sometimes yellowish at stipe base. **SPORES** 9.6-16.4 x 3.7-6.1 µm. **PILEIPELLIS** of narrow, non-gelatinized, long, simple, flexuous hyphae of variable length 16-100 x 4.6-14.8 µm with penultimate cells often shortened and end cells bullet-shaped or obtusely rounded, up to 30 µm long and slightly and obtusely swollen at tips, lacking any ornamentation, hyaline or pale straw-colour in KOH and Melzer's reagent, slightly disarticulating.

HABITAT found in open conifer and mixed

woodlands, especially with *Fagus* and *Betula*, usually on free-draining mineral soils.

NOTES: among its many colour forms we have two distinctly greenish ones, a vivid greenish form, the context of which is often streaked in the stipe producing a marbled effect (= *B. citrinovirens*), and an olivaceous yellow or olive-brown form with unchanging context.

Icones: (FM) Vol 3(3) page 79 (as *B. citrinovirens*) & 98 (typical form). (HE) page 167. (RG) pages 125-7.

10. *Xerocomus guidonis* *ad int.*

Syn.: *X. dryophilus sensu* European authors - see Notes below

Not yet recorded in the UK

PILEUS 40-100 mm, convex to pulvinate when young, unchanging or becoming broadly convex to plane to highly irregular and undulating with age. Surface dry to slightly moist, conspicuously tomentose when young, unchanging or appearing subglabrous with age, sometimes becoming rimose to split and often developing large cracks or conspicuous fissures. Colour when young near red to reddish brown sometimes overlain by olive brown when old, in some the red colour darkens markedly, in others the red fades and the olive brown predominates. **PORES** large, angular, olive to yellow, blueing with pressure, surface often appearing uneven. **STIPE** 50-80 x 10-20 mm wide at the apex, equal or enlarging slightly toward the apex, often pinched and narrowed at the base. Surface dry to moist, glabrous; apex colour yellow changing toward the base to reddish, the red colours being particularly evident in old specimens, darkening when bruised. **MYCELIUM** dirty white. **CONTEXT** yellow, with a slight reddening under the cuticle, ± red toward the base, at times intensely so, slowly and erratically becoming blue when exposed. **SPORES**. 12-16.5 x 5.5-7 µm, subellipsoid to subfusoid, not truncate, smooth, moderately thick-walled. **PILEIPELLIS** differentiated as a tangled trichodermium of heavily encrusted hyphae that stain pale ochraceous in KOH, the encrustations frequently spirally arranged.

Fig. 8. *Xerocomus pruinatus* with a rather redder than usual stipe (for a photograph of the more typical form see Field Mycology 3(3) back cover). The stipe context shows its characteristic bright yellow colour. Photograph © Alan Hills.

HABITAT *X. guidonis* seems to prefer calcareous soils and is associated with *Quercus*.

NOTES: it has recently been established (A. Taylor pers. comm.) that *X. dryophilus* is known only from the Americas, hence this new name for European collections. Not yet found in the UK, so if any collections are thought to be this species I would be very happy to examine dried material.

Icones: (FE8) page 458-464 described as *X. dryophilus*. (HE) page 183 & plate 36 described as *X. dryophilus*. (RG) page 105 described as *X. dryophilus*.

11. *Xerocomus moravicus*

Syn.: *Xerocomus leonis, Xerocomus tumidus*

PILEUS 30-75 mm hemispherical, convex, applanate, finely tomentose, dry, becoming cracked, sienna flushing yellow-ochre, or rarely apricot. **PORES** somewhat depressed around the stipe, round or irregular, lemon-yellow with a flush of olivaceous. **STIPE** 40-70 x 6-20 mm, fusiform or cylindrical, pointed towards the base, or more rarely rounded; finely tomentose, dry and finely punctate in upper part, pale lemon-yellow or pale ochre or flushed clay-buff then ochre. **MYCELIUM** pale cream to pale yellow. **CONTEXT** compact, soft, fibrous in stipe base, off-white, unchanging or gradually pale yellow. **SPORES** 9.5-12 x 5-5.8 µm, broadly subfusiform to almost ellipsoid in side view, more ellipsoid with rounded ends in face view, very pale to almost hyaline. **PILEIPELLIS** of irregular, suberect hyphae terminating in a series of ellipsoid, yellow-brown cells intermixed with chains of swollen, shortened cells with end cells tapered (fusiform) or ellipsoid, strongly coloured and at maturity irregularly and strongly sheathed, the sheathing breaking up to form ornamentation.

HABITAT found in open sunny spaces in parkland and wooded areas, mostly with *Quercus*, distinctly thermophilic.

NOTES: see Mattock (2000) for a detailed discussion of this species.

Icones: (FM) Vol 1(4) pages 114-6. (C&D) page 423 as *X. leonis*. (HE) page 227 (as *X.leonis*) & page 229. (RG) page 119 as *X. leonis*.

12. *Xerocomus pelletieri*

Syn.: *Phylloporus pelletieri*
Phylloporus rhodoxanthus

PILEUS 20-90 mm, convex, quickly expanding with margin becoming irregularly wavy, dark brick-colour or bay with a distinct olivaceous flush retained even on drying, ± finely cracking from the centre. **LAMELLAE** waxy, distant, decurrent, connected in places by veins, sometimes forming anatomising pores, lemon-chrome then more luteous, flushed sienna; rust-coloured to chestnut on bruising. **STIPE** 20-45/4.5-10 mm, equal or attenuated upwards or downwards, fusiform or rooting, lemon-chrome to luteous at apex, more ochreous to fulvous below, but soon spotted and streaked with chestnut or rust-colour or with brown-vinaceous flush. **MYCELIUM** yellow. **CONTEXT** pale lemon-yellow to coral in cap, flushed rust-colour or chestnut in the stem and darker in stem base. **SPORES** 10.1-13.6 x 3.5-5.0 µm subfusiform-ellipsoid in side view, more ellipsoid in face view. **PILEIPELLIS** of intermingled, filamentous hyphae, smooth to granulate, hyaline or slightly coloured, end cells rounded and slightly swollen, suberect then becoming repent, without "zebra-encrustations". 5-12.5um broad, in parallel groups.

HABITAT recorded mostly from southern England mainly with *Quercus* and *Fagus*, but also recorded with *Betula*, *Castanea*, *Alnus* and *Corylus*. Continental records show many with *Picea*, but as yet none known from the UK; I would be interested to hear of any collections from this host.

NOTES: this species is easily recognized by its lemon-chrome to yellow, waxy gills. It resembles members of the *X. chrysenteron* group when viewed from above. Often solitary, so care should be taken to double check what appear to be isolated *Xerocomus* fruitbodies.

Icones: (C&D) page 248. (FM) Vol 3(3) page 86. (FE8) page 353 & 509. (HE) page 153. (RG) page 93, as *Phylloporus rhodoxanthus.*

13. *Xerocomus porosporus*

PILEUS 35-75 mm, dark olivaceous brown with paler margin, becoming more sepia to cigar-brown, at first with yellowish tomentum which bruises on handling and darkens, particularly at

Fig. 9. *Xerocomus riparielus* is locally common in wet areas under *Salix* in the New Forest. This collection demonstrates the bright red colours, cracking cap surface and blueing flesh. Photograph © Alan Hills.

the margin; finally cracking either deeply or minutely and at centre showing yellowish to whitish flesh. **PORES** compound, angular, lemon-yellow, dirty greenish yellow with age, then later becoming grey to pale brown, grey-blue with pressure. **STIPE** 35-70 x 8-15 mm, equal or tapered toward base, when young clean-looking, lemon-yellow, becoming flushed lemon-chrome, soon changing to drab, matt and dirty grey fibrillose-streaky below, slightly ribbed; with handling becoming somewhat polished, often with bay or brown-vinaceous to blood-red narrow zone at apex. **MYCELIUM** white, showing some yellowing at the ends with age. **CONTEXT** pale lemon-yellow in the cap, deeper yellow in the stipe which toward the base becomes yellow brown, at times showing pinkish tinges, this becoming dark brick-colour or flushed brown-vinaceous at the base, not blueing. **SPORES** 11.4-17.2 x 4.5-6.5 µm subfusiform in side view, ellipsoid in face view, truncate at one end. **PILEIPELLIS** a trichoderm of short snuff-brown hyphae up to 22 µm broad, end cells bullet-shaped showing heavy zebra-patterned encrustations.

HABITAT widespread and frequent in broadleaved woods, especially with *Quercus*.

NOTES: the changing stipe colour and the truncate spores make this easy to identify.

Icones: (FE8) page 515. (HE) page 211. (RG) page 103. (RP) page 202.

14. *Xerocomus pruinatus* (Fig. 8)

Syn.: *Boletellus pruinatus, Boletus fragilipes, Boletellus fragilipes*

PILEUS 40-120 mm, starting hemispherical to convex becoming flattened, blackish purple, purplish bay to dark vinaceous, becoming vinaceous chestnut or purplish bay at the centre,

vinaceous apricot towards the extreme margin. Faintly wrinkled and covered in a hoary bloom or white waxy surface, which is rapidly lost on handling, not cracking. **PORES** irregular in shape, with age becoming orange-brown at the orifices, ± blue to brown with pressure. **STIPE** 30-100 x 15-30 mm, equal to subclavate, fairly solid, brittle, pale yellow to lemon-yellow or lemon-chrome at apex, often irregularly but minutely channelled and becoming ornamented near the centre downwards, with very fine, scattered, blood-red dots, redder at the base. When fresh the stipe quickly turns to blue green with handling. **MYCELIUM** yellow, paler yellow with age. **CONTEXT** with a pink to red line below the cuticle, lemon-chrome to luteous throughout, at times streaky showing a combination of yellow tones, more brownish towards the base, ± showing blue in the stipe, occasionally reddish at base when mature. **SPORES** 10.8-14.8 x 4.3-5.7 µm, subfusiform in side view, ellipsoid in face view, slightly striate in lactophenol cotton blue. **PILEIPELLIS** of erect hyphae, composed of chains of short, broad, hyaline to snuff-brown cells, 5.6-17.1 µm, all showing ± zebra-patterned encrustations.

HABITAT locally common, found in mixed and broadleaved woodland clearings and parks, late in the year, often abundant under *Fagus*.

NOTES: this species, like *X. cisalpinus*, contains large thick-walled ± amyloid hyphae in the stipe base, found by staining fragments in Melzer's reagent for some minutes, after which they are washed out in chloral hydrate solution removing all Melzer's, and mounted in clean chloral hydrate solution.

Icones: (FM) 3(3) back cover. (FE8) page 470-472. (RG) page 108-9.

15. *Xerocomus ripariellus* (Fig. 9)

Syn.: *Boletellus ripariellus*

PILEUS 22-80 mm. convex then plano-convex to flat, margin slightly inrolled when young, finely tomentose at first, becoming somewhat smooth, vibrant blood-red to pale red, apricot, umber to olive grey depending on the amount of sunlight it receives; cracking to show pale yellow flesh below, even from early age, in dry conditions the cracking becomes severe giving a crazy paving effect. **PORES** Bright yellow when young becoming bright chrome yellow, fading with age to a yellowish ochre, very large, angular, turning slowly blue on bruising. Snuff brown when very old. **STIPE** 22-70 (90) x 7-18 (25) mm, slender to robust, at times a spectacular bright chrome yellow, or pale yellow when young, ornamented upwards from the base with reddish flecks (this punctate effect can at times cover the complete stipe), immediately ± strongly deep blue to vinaceous blue on handling. **MYCELIUM** white, with age some yellowing at the ends. **CONTEXT** yellow throughout in immature specimens, blueing very quickly towards the stipe-base when fresh, more slowly in older specimens. **SPORES** 11-13 x 3.5-4.5 µm. elongate ellipsoid in face view, subfusiform in side view, slightly striate when examined in lactophenol cotton blue. **PILEIPELLIS** a trichoderm of fairly short hyphae, end cells 5.7- 17.1 µm mostly somewhat enlarged, at times when old swollen up to 35 µm, having ± heavy zebra-patterned encrustations.

HABITAT mostly with *Salix* in damp places that appear to never dry out fully, but also recorded with *Alnus*, *Quercus* and *Populus*.

NOTES: First recognised as a distinct species by Redeuilh (1997). Recognized by its rather unusual habitat preference and striking appearance when fresh.

Icones: (FE8) page 519. (RG) page 111.

16. *Xerocomus rubellus* (front cover)

Syn.: *Boletus sanguineus, Boletus versicolor*

PILEUS 15-80 (120) mm, hemispherical then convex, soon expanded to plano-convex and ± wavy at margin, when young uniformly deep vermilion to deep red, soon becoming shades of deep coral to pale carmine ± losing the red shades at the centre, fading to olivaceous buff, olivaceous brown, at times almost completely so; damaged or slug-eaten places turn dull yellowish brown. **PORES** labyrinthine, large, angular, sulphur-yellow becoming dull lemon-yellow, blueing slightly on bruising. **STIPE** 30-65 x 5-18 mm very variable, slender to stout, when slender at times with a somewhat bulbous base, ± wholly dotted with coral or pale red over a background

colour of golden to dirty yellow, lower stipe becoming ochraceous, normally somewhat striate. **MYCELIUM** pale cream. **CONTEXT** pale yellow throughout, with a rich purple-red line under cuticle, soon showing dirty blue tones above the tubes and beneath the cuticle, later this blue or vinaceous mottling may continue down the centre of the stipe, becoming a deeper yellow to buff-chrome toward the base, ± carrot-coloured in dry weather (or carrot-coloured dots sometimes present as described previously for *X. communis*). **SPORES** (9.8) 11.1-12.8 (14.7) x 4.5-5.7 µm, subfusiform in side view, ellipsoid in face view. **PILEIPELLIS** of cylindric, hyaline or pale straw-coloured hyphae 3.7 x16.3 µm broad, showing clear zebra-patterned encrustations, which are always present but at times very faint; end cells highly variable, mostly elongate slowly tapering to a rounded end, others bullet-shaped, at times small and tapering, looking withered.

HABITAT this species appears to prefer moist shaded sites, mainly with *Quercus* in parkland and woodland but can also be found in sunny areas well away from the canopy of its host.

NOTES: *X. rubellus* can be easily recognized by the bright red cap colours and red punctate stipe in its early stages, but toward maturity the cap colour can bleach outward from the crown making it appear similar to *X. communis*.

Icones: (FM) 3(3) Back cover. (HE) page 187. (RG) page 107. (RP) page 204 (as *B. versicolor*).

17. *X. silwoodensis* (back cover)

PILEUS 20-110 mm diam, somewhat convex to hemispherical, only when very young with an inrolled margin, becoming plano-convex; initially finely tomentose becoming matt with age; highly variable in colour, reddish-yellow to dark brown most typically within this range it is a rich red-brown sometimes showing lighter shades at the margin; cracking only very slightly, and then only toward the margin and never revealing any colour in the context beneath. Sunlight can have a significant effect on the pileus, to the extent that bleached and unbleached areas can be present within a single example. **PORES** bright pale yellow to straw yellow, ± red-spotted with age, almost round when young, becoming angular especially toward the margin, not blueing or changing with pressure. **STIPE** very variable in both size and shape 22-70(130) x 7-33 mm, cylindrical to subclavate, always tapering at the very base, often deeply rooting, sometimes with up to half of the stipe below soil level; at times, slightly curved but never bent unless below soil level. There is a narrow yellow band at the apex bearing decurrent pores that fuse to form an easily observed crude reticulum. Background colour concolorous with the pileus, becoming straw, buff to dull red-brown at mid stipe, base always somewhat buff. **MYCELIUM** off-white to pale yellow, never golden yellow, pale yellow when dried. **CONTEXT** firm, on cutting white to off-white throughout, within the pileus soon changing to light yellow to yellow. Varying amounts of colour change have been observed in the stipe from a mottled pale red to greyish rose to a more uniform development of these colours concentrated in the cortex, leaving the centre tissues unchanged; rarely there is no colour change. A reddish-purple line above the pores and below the pileipellis is present in some collections. Insect larval tunnels are yellow when observed in fresh fruitbodies, becoming black with age. **SPORES** (9.1) 9.5-14.6 (18.4) x 4.0-5.8 (7.3) µm, subfusiform to broadly subfusiform in side view, ellipsoid to broadly ellipsoid in face view, lacking striations, a small percentage with oil drops. **PILEIPELLIS** ± 100 µm in thickness, a trichoderm of cylindrical cells 5.7-18.4 µm in diameter, 8-110 µm in length, lacking any ornamentation, forming short chains that end abruptly after three individual elements, rarely four or five, some branching noted but again this is rare, terminal hyphae rounded to bullet-shaped, variable in length, easily disarticulating, appearing more so due to the short chains.

HABITAT a species that seems to be specific to *Populus*.

NOTES: recently described (Taylor *et al.*, 2007) and to date found only in Berkshire, Hampshire & Hertfordshire, with single sites in Spain and Italy. Probably confused in the past with *X. ferrugineus*, so note the host tree.

Icones: see the back cover and Taylor *et al.* (2007:407), not present in popular field guides.

18. *X. subtomentosus* (Fig. 10)

Syn.: *Boletus lanatus, Xerocomus xanthus, Xerocomus flavus, Xerocomus rubrotinctus*

PILEUS 40-150 mm, hazel to pale sepia with distinct citrine or olivaceous-yellow or olivaceous-brown tomentum giving felty appearance, the felt puckered in places, becoming leather colour or yellowish sepia, bay or dark brick-colour where tomentum is bruised; at times cracking to show pale lemon-yellow flesh. **PORES** round at first, later large and angular, bright golden yellow when young, becoming brownish yellow to greenish yellow with age, often blueing when bruised. **STIPE** 30-100 x 5-25 mm, medium to slender, fusiform, generally distinctly tapered, pale yellow to yellow-brown, buff to pale fulvous at apex, darker towards centre, with or without striations and occasionally with a coarse brown punctate network. Stipe cuticle splitting in dry weather and often peeling back. **CONTEXT** ivory to pale lemon-yellow or straw-yellow, more strongly yellow above tubes, with date brown or purplish line under cuticle, the lower stipe often having a soft pinkish brown area, if becoming blue-green then generally in cap and not in stipe. **SPORES** 9.8-14.8 x 3.9-6 µm, subfusiform in side view, more ellipsoid in face view. **PILEIPELLIS** of filamentous, flexuous hyphae 4.5-17.7 µm broad, suberect intricate mixture of chains of shortened and elongate hyphae in varying proportions, often disarticulating, end cells mostly rounded, rarely tapered or swollen, pale straw-colour in NH4OH, smooth or almost so.

Fig. 10. *Xerocomus subtomentosus* showing the pale lemon-flushed context, browner at the base and the often reticulate upper stipe. Photograph © Alan Hills.

HABITAT occasional to frequent, in mixed broadleaf woods.

NOTES: examples of this species having yellow (var. *xanthus*) or red (*forma rubrotinctus*) caps have been described; this key does not cover these very rare forms.

Icones: (C&D) page 427. (RG) pages 121-123. (RP) page 23 as *B. lanatus*.

Notes on species pairs giving identical codes

There are just four species pairs that may need resolution. The following notes should help to separate them:

1. *X. ripariellus* versus *X. cisalpinus*

There is a clear difference in habitat: damp areas with *Salix* or *Alnus* for the former and drier woodland areas with *Quercus* for the latter. *X. cisalpinus* also has thick-walled ± amyloid hyphae in the stipe tissues.

2. *X. communis* versus *X. chrysenteron*

X. communis usually has carrot-coloured spots in the stipe base and occurs mainly with *Quercus* in disturbed or urban areas while *X. chrysenteron* never has carrot-coloured spots and occurs mainly with conifers and *Fagus*, but seemingly never *Quercus*.

3. *X. bubalinus* versus *X. chrysenteron*

X. bubalinus fruits in parklands with *Populus* and *Tilia* while *X. chrysenteron* prefers conifers. Also *X. bubalinus* has distinctly smaller pileipellis elements and slightly smaller spores. The cap flesh of *X. bubalinus* flushes strongly pink, with a blue line above the tubes.

4. *X. badius* versus *X. bubalinus*

The richer chestnut-brown to orange brown cap of *X. badius*, viscid when wet, is distinctive compared to the paler, yellow brown cap flushed with pinkish-red of *X. bubalinus*.

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STOP PRESS!

Hearty congratulations to Alan Hills, Ursula Eberhardt and Andy Taylor who described the new species *Xerocomus silwoodensis* (see back page). The International Institute for Species Exploration, based at Arizona State University have just announced their annual award for the ten most interesting new species described in 2007 across all groups of organisms (including fungi!). *X. silwoodensis* is species number seven in the list and was awarded for the following reason: "*This new mushroom species was discovered on Silwood Campus, a campus of Imperial College, London, although it is also found elsewhere (two additional sites in England and one each in Spain and Italy). The discovery of a new species in one of the most intensely studied floras in the world and on the campus of a leading education center for biologists illustrates how poorly species are known.*"

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