KEY E No blue/violaceous tones in either cap or stipe

I Cap not or scarcely striate; stipe fibrillose, scaly etc
A Species with clamps (otherwise recalling sg. Pouzarella)
1 Grey brown, ± conical/papillate, inocybeoid.....hispidulum
(eg on Dawlish Warren, see Orton 1960 as L.inocybeoides) N82b
2 Olive brown, clitocybeoid, + large cheilocystidia.....indutoides
(only known from calc. grassland, Yorks.) Orton 1960; N49b
B Species lacking clamps, caps scaly
1 Stout, cap with dark squamules on pale ground.....[scabropellis]
(grassland in Scandinavia)
2 Smaller dark grey-brown to red-brown, gill edge sterile
a Spores 9-12.5x6-9; stem base bruising slowly pinkish.....turci
(eg Perth on Cairnwell) Orton 1960; Bon195, C2325, CD958, N70a
b Spores 7.5-11x6-7.5; no pinkish bruising.....[pseudoturci]
(widespread but rare, esp. calc. inc. dunes) BK67, C2727, N70b

II Cap translucently striate when moist; stipe ± smooth, polished
A Colours clear yellow to tawny or red-brown
1 Clamps present; small, dark yellow-brown... .....[politoflavipes]
(recently desc. from calc. grassland) BK63, N50a
2 Clamps absent
a With green/olive tints in stipe, base often reddish
* Gill edge sterile.....exile
(inc. pyrospila, see Orton 1960) BK31, CD952, MJ24, N65
** Gill edge fertile (? only var of exile).....chloropolium
(not in Orton list, but in Ireland fide C&D) CD953, N66b
b Cap yellow to yellow-brown
* Yellow (= fulva Orton 1960).....formosum
(fairly common in north) BK35, C1862, CD954, MJ22, N67a
** Differing chiefly in brown gill-edge.....xanthochroum
(similar sites to last but rarer) Orton 1964: BK96, CD955
c Cap tawny to red-brown
* Differing little from last except in colour...[sphagnorum]
(little known, eg in sphagnum bog) BK85, N67b
** Stronger red colours.....rufocarneum
(Berkeley type (lost) Dorset, accepted by Noord.) N76a
B Duller brown to grey, ± hygrophanous species
1 Clamps present; grey-brown, omphalioid (sg.Omphaliopsis).parkense
(calc. grasslands) CD962
2 Clamps absent; gill edge dark brown.....atromarginatum
(rare, eg Kindrogan, dunes at Ynyslas and Betty Hill) N69b
3 Clamps absent; gill edge concolorous
Conspicuously translucently striate spp. (longistriatum complex)
a Spores only 7-9x6-7.5.....[longistriatum v.microsporum]
(widespread, ± calc. soil, often damp places)
b Spores larger, on average 10.5-11.5x7-8
* Strongly hygrophanous, stipe dull brown.....longistriatum
(L.majuscula of NCL, esp. on clay soil) N69a, N85c
** Strongly striate, ochre brown...longistriatum v.sarcitulum
(NU, calc. or acid) BK50, Bon195 (sarcitum), C2323, CD957
*** Less striate, lighter colours.....[ochromicaceum]
(recently desc., poor eg calc. grassland) BK58, N59a

[redacted]

Produced for the BMS by the Cambrian Institute of Mycology

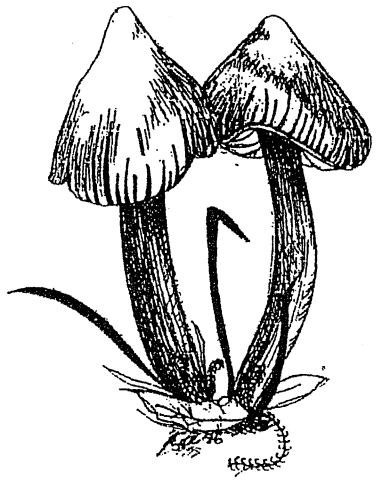
WAXCAP-GRASSLAND FUNGI

1: Hygrocybe, Camarophyllopsis and Dermoloma in Britain

2: Keys to Grassland Species of Leptonia s.l.

Alick Henrici

July 1996



HYGROCYBE, CAMAROPHYLLOPSIS & DERMOLOMA IN BRITAIN

Alick Henrici

"...these rather attractive but sometimes bewildering fungi"
Peter Orton, 1960

This is neither a key nor a check-list, though half way to both. British species, together with others that might occur here, are presented in a taxonomic arrangement following Boertmann 1995 for Hygrocybe, and Arnolds in Flora Agaricina Neerlandica (FAN) for Camarophyllopsis and Dermoloma. Subgenera, sections and subsections of Hygrocybe are here as defined by Boertmann. In a few places further informal groupings, labelled a), b) etc, have been introduced for convenience within the larger subsections.

Approach Taken

The author makes no claims to specialist knowledge in this area. No independent assessment has been attempted, and no material reexamined. This is simply a résumé of the taxa currently believed to occur in Britain, presented in the terms used by the above authors. Their nomenclature and synonymy is adopted with only a few minor exceptions (noted explicitly). Boertmann covers all the British species of Hygrocybe with the exception of H.aurantia (a probable alien, described from N.America). FAN also covers most of these species, those omitted being here marked '-FAN'. Northern European species not so far known in Britain are listed in [ ].

The main British source work is Orton in Part III of NCL 1960, a major milestone in European Hygrocybe studies, and the basis of the treatment in Moser's Keys to Agarics and Boleti. Orton provided very full descriptive keys, besides describing nine new species and five others then new to Britain. References are given under the species concerned to these and all other descriptions he has published since. For a further European overview see Bon 1976, where rather more species are recognised than in the present account, as well as numerous varieties and forms.

Higher Taxonomy

The traditional concept, used in NCL, of a single large genus Hygrophorus has now been long abandoned. Orton & Watling (1969) proposed a two genus scheme of Hygrophorus and Hygrocybe, with the latter in six sections. The relations between the various approaches can be summarised as follows:

NCL 1960 Subgenera	Orton & Watling 1969 Sections of Hygrocybe	Present Treatment
Camarophyllus	Cuphophyllus	Hygrocybe sg. Cuphophyllus
	Camarophyllopsis	Camarophyllopsis sg. Camarophyllopsis (only C.schulzeri in Britain)
	Hygrotrama	Camarophyllopsis sg. Hodophyllus
Hygrocybe	Hygrocybe	Hygrocybe sg. Hygrocybe + most of sg. Pseudohygrocybe
	Neohygrocybe	Hygrocybe sg. Pseudohygrocybe p.p. (Section Neohygrocybe)
	Amylohygrocybe	excluded (Porpoloma p.p.)

At a higher level FAN abandons the concept of a family Hygrophoraceae. The three genera treated here become the first tribe, Hygrocybeae, and Hygrophorus alone becomes the second tribe, Hygrophoreae, of a total of 17 tribes constituting the Tricholomataceae. The Hygrophoraceae were traditionally largely defined by their thick gills, and more recently by the long basidia which cause these thick gills (basidium-length mostly over 5 x spore-length fide Singer). But boundaries between eg Hygrocybe and Omphalina are considered too blurred to warrant separate families. Placement here of Dermoloma is a recent development. FAN Vol.2 followed Kühner in considering Dermoloma to be closer to Tricholoma.

Some background

This document was first put together in draft in the autumn of 1995 in response to plans for a survey of British grassland fungi. I did not feel competent to produce a key to Hygrocybe but felt a summary of this nature might be a useful aid to identification. Three months later David Boertmann's admirable book on Hygrocybe appeared. If it had come out earlier I would not have embarked on the exercise. As it is he has enabled me to substantially revise and sharpen up my draft. I hope it may be found a useful supplement to his work; it certainly is no substitute.

Descriptions and Illustrations

Descriptive material has been limited to the main discriminatory features of each species. It thus varies from almost none (for unmistakeable species such as H.calyptriformis) to somewhat more extensive for critical species. Illustration citations take into account Boertmann's published assessment of the main sources. But note that Cetto Vols 6 and 7 (=C2400 upwards) evidently came out too recently to receive his comments. Nor does he discuss Bon or Courtecuisse & Duhem. So citations from these works should be treated with less confidence than the rest.

NB. A number of references are made to collections at Kew. The names recorded there and the approximate numbers of collections of each have been ascertained. But in these genera the Edinburgh holdings are likely to be equally significant, and these have not been consulted.

Conservation

The three genera treated here appear to be at least as well represented in Britain as anywhere in Europe. The great majority of European species are present. Even on the Island of St Kilda, far out on Britain's Atlantic extremity, 33 species have been recorded (reduced to 28 spp. + 1 var. in this account where H.virginea/nivea, H.conica/nigrescens, H.chlorophana/flavescens and H.insipida/subminutula are all no longer distinguished). However unimproved grassland of a type capable of supporting such a rich Hygrocybe flora has already become a rarity over much of the country.

It seems likely that Britain may have several of the richest Hygrocybe sites in Europe. I share David Boertmann's hope that making available further information about these species may lead to more accurate site evaluation, and thus to the appropriate focusing of conservation measures.

A.H.
July 1996

TAXONOMIC ARRANGEMENT

Non-British in [ ]. Not recognised as distinct in ( ).

Abbreviations

AA1,3	Arctic & Alpine Fungi, Vol.1 1985, Vol.3 1990
B	Boertmann: The genus Hygrocybe 1995
BK	Breitenbach & Kränzlin: Fungi of Switzerland Vol.3
C	Cetto: I Funghi dal Vero, Vols 1-7
CD	Courtecuisse & Duhem: Mushrooms & Toadstools, English Edn. 1995
Cke	Cooke: Illustrations of British Fungi 1880-1890
DD	Dahncke & Dahncke: 700 Pilze in Farbfotos 1982
D+	Dahnke: 1200 Pilze in Farbfotos 1993
FAN	Fl. Ag. Neerlandica Vol.2 1990 (for Hygrocybe), Vol.3 1995 (for Dermoloma)
FRIC	Fungi Rariorum Icones Colorati
K&R	Kühner & Romagnesi: Flore Analytique
L	Lange: Fl. Ag. Danica
L&H	Lange & Hora: Collins Guide to Mushrooms & Toadstools
Md	Marchand: Champignons du nord et du midi
MJ	Moser & Jülich: Farbatlas
Myc.	The Mycologist
NCL	New Check List 1960
NM	Nordic Macromycetes Vol.2 1992
RP	Roger Phillips: Mushrooms
TBMS	Trans. Brit. Myc. Soc.
W&D	Wakefield & Dennis: Common British Fungi

Authors referred to without a date imply the following works:

Arnolds: Section on Hygrocybe in FAN Vol.2 1990
Boertmann: The genus Hygrocybe 1995
Bon: Mushrooms and Toadstools 1987
Massee: British Fungi 1910
Moser: Keys to Agarics & Boleti (English edition) 1983
Orton: NCL Part III 1960
Rea: British Basidiomycetae 1922
Singer: The Agaricales, 4th Edn. 1986

Further References:

Arnolds 1986a Persoonia 13:57-68 Notes on Hygrophoraceae VI
Arnolds 1986b Persoonia 13:137-160 Notes on Hygrophoraceae VIII
Bon 1976 Doc. Myc. 7(25):1-24 Clé Monographique des Hygrophoraceae
Hora & Orton 1955 TBMS 38,400-404 Three New British Agaric Records
Orton 1960 NCL Part III, Notes on Genera & Species
Orton 1964 Notes RBG Edinb. 26:43-65 Notes on Brit. Ags II
Orton 1969 ,, ,, 29:75-127 ,, ,, III
Orton 1980 ,, ,, 38:315-330 ,, ,, VII
Orton 1984 ,, ,, 41:565-624 ,, ,, VIII
Orton 1987 ,, ,, 44:485-502 Notes on some Ags from Scotland
Orton 1988 TBMS 91:545-571 Notes on Brit. Ags IX
Orton & Watling 1969 Notes RBG Edinb. 29:129-138 A reconsideration of the clasification of the Hygrophoraceae
Watling 1973 Identification of the Larger Fungi. Hulton Press
Watling & Rotheroe 1989 Proc RSE 96B:111-126 Macrofungi of sand dunes

GENUS HYGROCYBE (Fr.) Kummer 1871

Gill trama regular or interwoven; habit non-mycorrhizal. Mainly species of unimproved grassland or moorland (to be assumed below whenever no habitat details are given). Hygrophorus differs in having bilateral gill trama, in often having a veil, and (fide Singer) in being always mycorrhizal, and is thus largely a woodland genus.

Subgenus Cuphophyllus Donk
= Cuphophyllus (Donk) M.Bon = Camarophyllus s.Singer, Moser, NM
= Hygrophorus sg. Camarophyllus s.NCL p.p.

Gill trama of narrow interwoven hyphae, 3-5(-8)µm wide. Colours dull. Gills strongly decurrent. Singer recognises sections based largely on colour. Arnolds has no lower subdivisions.

1. Section Cuphophyllus

1.1 Subsection Virginei (caps ± greasy, hygrophanous, margin striate)

a) Caps pale (white to buff, in one var. darker at disc)

Cap to 2cm, ivory to pale cream, with strong smell of russian leather or of cedar-wood pencils, that can persist at least 50 years in dried material
In other respects similar to next. Not uncommon
russocoriacea (Berk. & Miller) Orton & Watling
B47, BK77, CD175, DD110, L164B, RP64

Cap 1-5(-9.5)cm, ± pure white, slightly glutinous; spores 7-12.5x3.5-7.5; "Extremely variable, particularly in size of basidiocarps and spores" FAN.
Common. Pink tinges, rather common on the cap or gills (eg in C1100) or at the stipe base (var. roseipes Massee = f.roseipes of Bon103), are infection by a hyphomycete, Fusarium sporotrichoides Sherb.
virginea (Fr.) Orton & Watling
B49, BK103, Bon103, CD174, DD111, L164C,F, RP64 (niveus)
Syn. nivea (distinct in NCL, K&R, Moser, spores smaller fide Orton)
?Syn. borealis Bon103 (not recorded from Britain)
NB. If gills crowded and spores much smaller, 4-5x2-3, see Clitocybe ericetorum Quél., often in similar habitats. C1041, RP46

Whole cap evenly but palely coloured, striate when moist, clay-buff with age; often stouter and tougher than the type variety, but does not differ microscopically; can resemble pratensis v.pallida, but that has considerably shorter spores
Desc. from dunes and fields in Devon and Cornwall. Later British records from eg Welsh dunes, Hampshire chalk downs
virginea v.ochraceopallida (P.D.Orton) Boertm. (-FAN) B53, BK104?
Type desc. (as species) Orton 1980, p.329

Cap pale cream cap; smaller spores 5.5-8.5x3.5-5.5; very short basidia 25-35(-40)x6-8
As yet little known. Distinct from last? Desc. from Switzerland
[cereopallidus Clém.] (-FAN) C2795, CD176, D+144 (=DD111 niveus)

Cap largely pale, but with small rather sharply delimited grey-brown zone at the disc
Differs only in colour from the type var. and in the Netherlands always grows with it fide Arnolds. Common on acid heaths fide Orton 1960 (as subradiatus). But in Denmark spore Q higher and usually on calc. soils
virginea v.fuscescens (Bres.) Arnolds
B51, BK104 (or = v.ochraceopallida?), Bon103 (subradiatus, or = next?), C231, CD177, MJ3 (Camarophyllus fuscescens)
Syn. H.subradiatus s.NCL and s.Lange p.p.
Also recorded from Mull as niveus v.fuscescens
Considered an independent species in K&R, NCL, NM, CD

b) Caps brown (grey-brown to red-brown)

Cap to 6.5cm, rather fleshy, pale or dark brown, gradually slightly darker to the disc, dry to greasy with thick gelatinised cutis
Pale collections easily confused with last, but spores broader (lower Q), gills typically interveined. Rare in calcareous pastures
colemanniana (Bloxam) Orton & Watling B55, BK84, Bon103, C665, CD179
also (as subradiatus) Bon103?, C668, CD178, L165D
Syn. H.subradiatus s.K&R, Lange non NCL

c) Caps grey with violaceous tones

Cap 2-4cm, shiny ('lacmus' = lacquered); stipe base white; spores 6-9x4-6 (but larger when basidia 1- or 2-spored, eg 11x7 in Bon); smell often sweetish; usually on sand or peat
Reported as British in Orton 1960 from a damp field in Devon. Since then several recs at K from the west or north. Also in moss on mountain tops fide Watling 1973
lacmus (Schumach.) Orton & Watling s.Arnolds, non NCL
B57, BK88, Bon103 (subviolaceus), CD173, MJ2 (Camarophyllus subv.)
Syn. H.subviolaceus Peck of NCL + auct. mult.
Desc. Orton 1960, p.260 (as subviolaceus).

[?Syn. cinerea (Pers.) Orton & Watling (-FAN) Bon103, C2794, L163B
Stout like pratensis, cap pale grey 3-6cm, stipe 5-10mm wide. All recs old, most from Scotland. Not seen by Orton. But for Rea (as pratensis v.cinereus) "heaths and downs. Not uncommon". For Boertmann 'insufficiently known', probably only lacmus with the violaceous tones faded]

Similar but stipe base yellow; spores subglobose, mainly 6-8.5x4.5-6; smell indistinct; usually on calc. soils
Not uncommon fide Orton
flavipes (Britzelm.) Arnolds
B59, Bon103, C1102 (lacmus), L165B (lacmus), MJ3 (Camarophyllus f.)
Syn. H.lacmus s.NCL + auct. mult., non Arnolds

Similar to last, "merely a small and slender form?" (Boertmann)
Cap to 4cm, strongly striate to the sharply delimited brownish disc, dry with thin cutis. On sandy calc. soils. Described 1989 from Holland, also reported from Denmark and Sweden. Not known in Britain
[radiata Arnolds] B61
Syn. H.subradiatus s.Konrad & Maublanc non al.

1.2 Subsection Cuphophyllus (caps dry and non-hygrophanous)

Cap dull orange, 3-5(-9)cm (NM), 5-10cm (Bon); spores 5-7x4-5.5
Common, and even in woods much commoner than its woodland look-alike Hygrophorus nemoreus (see eg BK121)
pratensis (Pers.:Fr.) Murrill
B41, BK76, Bon103, C225, CD171, DD113, L165F,F1, MJ2 (Cam.), RP60

Cap ivory/cream throughout, otherwise as last
Not uncommon fide Orton, but only few mainly Scottish recs at K.
Can develop pink Fusarium stains as in virgineus fide Orton
pratensis v.pallida (Cooke) Arnolds
B43, Bon103 (berkeleyi), C2443, Cke 893(932)A, CD172, MJ1 (Cam. berk.)
Syn. H.virgineus s.K&R, DD112 (and ? s.auct. Brit. p.p.)
Syn. Hygrophorus berkeleyi Orton = H.ortonii Bon = Cam.berkeleyanus Clém.
Type desc. Orton 1960 p.259
[Orton described H.berkeleyi to raise Cooke's variety to a species. He had to give it a new name as there was already a different H.pallidus Peck. So he chose to commemorate Berkeley, who had first described this variety, though without giving it a name. But unfortunately there was also an earlier H.berkeleyi Sacc., hence the multiplicity of names for what all agree is the same taxon]

Cap grey, small (2cm in only British collection), slightly tomentose/scaly
Spores small, 4.5-6x4-4.5. Found Argyll 1985 (G.Dickson)
First European record of a species desc. from N.America. A few collections since from Sweden
canescens (Smith & Hesler) Orton (-FAN) B45
See desc. Orton 1987, p.489

2. Section Oreocybe Boertm.

Three closely related montane species with ± viscid cap and stipe, at least in young specimens

Cap 1-2.5cm, chrome-yellow with slight violaceous tinge at centre; gills pale lilac; spores 6-8x3.5-4.5
"A delicate and very distinct fungus, in some ways resembling H.laetus but with characteristic colours" Orton. Described from mossy Calluna heath, Rothiemurchus
xanthochroa (Orton) Moser (-FAN) B67, CD180
[Exc. C673, Clitocybe sp. fide Boertmann]
Type desc. Orton 1960, p.271, supplemented Orton 1964, p.53
Type is the only collection at K

Cap 1-2cm, yellow to yellow-brown, tinged violaceous; gills pale dirty ochraceous; spores larger, 7.5-10x5-6
Rare in peat on Scottish mountains above 2000 ft.
lilacina (P.Karst.) Moser (-FAN) B69, CD181
Material at E? None at K

Cap 0.3-3cm, pale lemon yellow
Easily confusable with Omphalina luteovitellina or O.hudsoniana, and in similar habitats, but non-lichenised, + clamps. British fide Boertmann
citrinopallida (Smith & Hesler) Kobayasi (-FAN) AA1/11, B65
Syn. vitellina s.Moller (his description wrongly cited in NCL for Orton's concept of vitellina, recognised as distinct in Orton 1964)

3. Unplaced Species (within sg. Cuphophyllus)

Cap dark brown-grey when moist, 1-3cm, omphalioid
Strictly arctic/alpine. Not known in Britain
[cinerella (Kühner) Arnolds] (-FAN) B63, MJ2 (Camarophyllus c.)

Cap deep purple at centre, paler at margin, only 4-10mm; woodland
Distinctive minute omphalioid woodland species. Gills very pale. The only British record by Courtecuisse in Ruislip Woods on soil of a ditch bank during the European Congress 1992, det. Laessoe, Arnolds and Kuyper. Previously known only from Belgium (first collected 1977) and the Netherlands
viola Geesink & Bas B71
See desc. in Persoonia 13:66,1986, where it caused Arnolds to write "The differences between Hygrocybe and Omphalina are not as fundamental and easy as often thought"
NB. Omphalina discorosea (C1479) and O.demissa (CD345) are both similar, but have clamps at all septa. The first is larger (1-3cm) and the second (British but rare) has somewhat larger spores.

4. Excluded Species

The following species has been placed in many genera under several names. It was considered a Hygrophorus by Rea, and is placed in Cuphophyllus by eg Bon, Courtecuisse, and in Camarophyllus in B&K. For its latest placement see Norvell, Redhead & Ammirati, Mycotaxon 50:379-407,1994.

Cap greenish, caespitose on conifer stumps, uncommon
Chrysomphalina grossula (Pers.) Norvell et al.
BK75, C1118, CD170, DD127, L60H
Syn. Camarophyllus g. in B&K = Cuphophyllus g. in Bon, C&D
= Omphalina g. in FAN Vol.3 p.80 (and in Cetto, DD)
= Gerronema g. in Singer
Syn. Hygrophorus wynnei Berk. & Broome in Rea = Omphalina w. in NCL
Syn. Omphalia abiegna in K&R, Lange

Subgenus Hygrocybe
= Conici s.K&R

Gill trama very regular, of broad greatly elongated elements, tapering towards the ends, 200-1000(-1500)x10-35µm. In several species these can project from the gill margin as pseudocystidia. Caps usually acutely conical/campanulate, often with a somewhat up-turned margin when old, but in section Chlorophanae convex to broadly umbonate. Usually bright coloured, often rather fragile. Gills narrowly attached.

1. Section Hygrocybe

Cap usually ± viscid, conical. Stipe dry. Spores usually over 10µm long.

1.1 Subsection Nigrescentes (all parts blackening with age)

Many species described, but all treated by K&R and now by Boertmann as varieties or even txonomically insignificant forms of a single variable H.conica. The range of possibilities is well shown in the array of paintings in C&D p.157. Some collections have medially swollen 2-spored basidia (so-called Godfrinia-type) once considered very significant, but the genus Godfrinia R.Maire 1902 based on this phenomenon has now been abandoned (see Singer 1986 p.117).

Spore quotient c.1.5, spores mainly 8.5-10x5-6.5, larger when 2-spored; gills ± yellow
  conica (Schaeff.:Fr.) P.Kumm.
    B159, Bon105, CD189+CD191, DD120, L167D,F,F1,H, MJ5, RP61
  inc. nigrescens = conica v.pseudoconica (MJ5) = f.pseudoconica in FAN
  [NCL distinguishes:
   - conicus: slender, cap 1.6-4(-6)cm, acute, ± yellow; usually 2-spored
   - nigrescens: more robust, cap 3.5-6(-9)cm, ± obtuse, ± red; 4-spored
   But the differences are not constant and these are at best forms.]

Gills grey to greenish; no red colours, at most dingy orange
  Several poorly known taxa with a variety of colours are here listed together pending further clarification:
  conica v.chloroides (Malençon) Bon s.l. B161, CD190
  ?Syn. tristis s.auct. Bon105, C1110, CD186
  ?Syn. olivaceonigra s.Cetto C2439
                (a collection matching this perfectly from Bucks, 1994)
  ?Syn. cinereifolia Courtecuisse & Priou Doc.Myc.22:69,1992 CD187
                (Welsh dunes, Harlech and Kenfig, det. Courtecuisse)

As last but no yellow or orange colours at all; in dunes
  conica v.olivaceonigra (Orton) Arnolds CD185
  Desc. (as species) Orton 1960 p.263, from Norfolk (only the type + a watercolour at K)

Cap only 5-10mm, acutely papillate, deep red with yellow margin
  In swamps and bogs. Keyed in Orton 1960, but as yet no British records
    [conica v.conicopalustris (Haller) ex Arnolds] B161
  NB. H.riparia Kreisel, CD192, with Salix in dunes etc (listed in Moser and discussed in FAN) is somewhat intermediate between this and conica v.conica fide FAN. Also unrecorded in Britain, southern in Europe.

Spore quotient c.2; gills reddish; cap typically cherry-red
  Spores 10-12.5x5-6 (Boertmann), but 12-15x6-8 (Bon)
  Always coastal and usually the commonest 'conica' in dunes
  conicoides (Orton) Orton & Watling
    B163, Bon105, C2440, CD188, MJ15, Myc. 1(3):122,1987
  Desc. Orton 1960 p.262. Reduced to a var. of conica by Arnolds in 1974, but he now accepts it in FAN as a good species

1.2 Subsection Macrosporae (not blackening appreciably)

a) Caps yellow or tinted with red, fairly smooth

H.persistens complex: treated here as two species distinguished on spore shape. Only varieties for Boertmann (occasional intermediates found).

Spores ellipsoid, 8-16(-19)x4.5-8.5(-9.5); gills yellow to orange
  Cap sometimes partially tinted red. The commonest, wholly yellow, form is sometimes distinguished as v.langei (MJ13). Not uncommon fide Orton
  persistens (Britzelm.) Singer
    B153+155, BK97, Bon107, CD200+201, L167C (constans), RP65 (langei)
  Syn. langei of NCL = croceus of K&R = acutoconica of Moser (MJ6)
  Most often 2-spored, but largely 4-spored collections can also occur, uncorrelated with other characters of colour or habitat fide Arnolds. Very large spores arise from the not-infrequent 1-spored basidia.

Differing only in cap scarlet or orange-red when young, gills usually more orange, stipe usually more reddish (not worth a name for Boertmann)
  In dunes or dry limestone grassland
  persistens v.cuspidata (Peck) Arnolds C2796? (aurantiolutescens)
  Syn. aurantiolutescens Orton 1969 p.267, desc. from dunes

Differing in subglobose spores 9.5-12x7-10.5, Q=1.2-1.5
  Normally yellow. Only two collections at K, both det. Reid, one the material of RP64, which looks exactly like the subglobispora of RP65, though both are cited by Arnolds for their respective species
  konradii R.Haller B157, Bon107, C1955, CD197, RP64
  [Cap red-tinged in f.pseudopersistens Bon107, CD198. British?]

As last but gills ± white to pale yellow
  For Boertmann no other differences, and hence a form, but see below.
  Cap normally yellow (red when young in f.aurantiorubra, British?)
  Can look very like conica, but refuses to blacken. Uncommon fide Orton
  konradii f.subglobispora (P.D.Orton) Boertmann B157, C2444, MJ13, RP65
  Desc. (as species) Orton 1960 p.267
  [Fide Arnolds differs also from konradii in young cap more acutely conical, in having more primary gills (30-48 rather than 19-36) and in stipe pellis with substantial ixocutis to 100µm, rather than only 30µm]

b) Cap orange flushed with red; cap and stipe strongly fibrillose

Robust species, cap 5-8cm. Smell 'of meal' (Rea), 'mushroomy' (RP)
  Spores 8-12x5-8. 'Among grass on calcareous slopes with junipers' (Bon)
  Widespread but uncommon except in W.Scotland
  intermedia (Pass.) Fayod
    B149, Bon105, C230? (cap too smooth - Boertmann), CD195, MJ7, RP62
  [Orton 1960 describes cheilocystidia, but Arnolds could find only pseudocystidia (projecting hyphal ends) and even these usually absent]

c) Cap dark brown (sometimes nearly black with age)

Dark brown v.viscid cap (the name means 'date-brown') contrasting with bright yellow gills and stipe
Rare in damp calcareous grassland ('limestone or basalt' Bon), never seen by Rea. Until recently only 3 collections at K (Colonsay, Cumberland, Shropshire), though presumably more at E. But several records from the S.Devon coast, 1994-95. Category A on provisional Euro. Red Data List, 'Vulnerable' on British list
spadicea (Scop.) P.Karst. B151, Bon105, C672, CD193, MJ14

Differing in pure white gills and stipe
Described from America, known in Denmark and Germany
[spadicea v.albifolia (Hesler & A.H.Smith) Boertm.] D+165 (spadicea)

2. Section Microsporae Boertm. Spores (from 4-spored basidia) under 9µm (approx. = Sect. Obrusseae s.Bon)

Cap 2.5-7(-9)cm, lemon or golden yellow, sometimes with greenish tinges, slightly fibrillose when old. Often with the acute and splitting build of H.calyptriformis
Spores 7-9x5-6; with tapered pseudocystidia (hyphal ends) projecting up to 65µm from gill edge. Usually stouter and less fragile than the commoner chlorophana, as well as less glutinous. Uncommon or overlooked
citrinovirens (J.Lange) J.Schäff. (-FAN) B139, C651, L165A, MJ14
Syn. obrussea s.NCL, Kühner, Moser non Arnolds C1961, CD196, MJ7
Syn. brevispora Moller (spores only 5-8.5x4-6 fide Arnolds) C1117
Syn. cystidiata Arnolds
[Gill trama elements only 150-500x15-30µm, very short for this subgenus]

Caps pink (unmistakeable)
Occasional. Possibly commoner in Britain than elsewhere in Europe.
A snow-white form is also known (= var.niveus Cooke)
'Vulnerable' on provisional British Red Data List
calyptriformis (Berk. & Broome) Fayod
B137, Bon105, C1109, CD194, DD122, MJ6, RP62
[Spelt 'calyptraeformis' in NCL, FAN]

3. Section Chlorophanae (Herink) Arnolds

Cap viscid, stipe usually viscid. Cap obtusely umbonate rather than conical, thus resembling the next subgenus macroscopically. Colours lemon yellow to gold or orange

Cap 2-7cm, lemon yellow; cap and stipe viscid
Gills consistently lemon yellow. Spores 7-9.5x4-6.5. Common
chlorophana (Fr.:Fr.) Wünsche B141, BK81, Bon107, C2436, CD183, L166B
[The name implies greenish tinges but these are scarcely apparent. It would better suit H.citrinovirens]

"Differs only in the orange colours of the young basidiocarp; older specimens of the two varieties cannot be distinguished" Arnolds in FAN
Known from France and the Netherlands
[chlorophana v.aurantiaca Bon] Bon107, L166D (as forma)

Very similar to chlorophana but deeper coloured and less glutinous
"It may be better to regard this as another infra-specific taxon of H.chlorophana" Arnolds. Distinguished (fide Orton 1960 p.255 footnote) by: stipe drier, gills chrome yellow, spores narrower. Somewhat less common? (not distinguished at all by Boertmann)
flavescens (Kauffm.) Singer s.auct.Europ.
BK86, C1961 (obrussea), DD116 (chlorophana), L166C (obrussea), MJ4 + MJ11, Myc.1(3):123,1987
Syn. euroflavescens Bon187, CD182, described in the belief that Kauffmann's American flavescens is probably distinct.
I know nothing about flavescens s.Favre (C2442), alpine.

Cap 1-3cm, lemon yellow; gills broadly attached, pale; cap and stipe both very glutinous, stipe often darker at apex
Narrower spores than chlorophana, 7.5-8.5x3.5-4.2
glutinipes (J.Lange) Haller
B143, C1960, CD184, L167E (citrina v.glutinipes), MJ3
Syn. citrina (Rea) Lange s.auct.mult. Bon109, MJ11
?Syn. H.citrinus Rea s.Rea (TBMS 3:228,1910), no material at Kew, only a water-colour by Rea presumed to be of the type, so a nom. dub.
Syn. aurantioviscida Arnolds fide Boertmann. C1106 (citrinus) is cited by Arnolds, but for Boertmann this picture ?= ceracea
NB. Taken here s.Kühner with long gill trama elements, 65-420x8-13. For glutinipes s.Arnolds with short gill trama elements, 30-160x4-23 see insipida

Differing from last only in the bright orange-red cap and stipe
Rare. Known only from Norway, Denmark, France
[glutinipes v.rubra Bon] B145

Cap small, (0.5-)1-1.5(-3)cm, papillate; differing from glutinipes in dry stipe and broader spores 7.7-10x4.5-6.5
Aspect of a small non-blackening red-orange conica. Rare and little known. No authentic British records
[subpapillata Kühner] B147, C2441?
Syn. mucronella s.K&R non al.

4. Unplaced Species (within sg.Hygrocybe)

Small fragile red species resemblimg H.miniata etc, with weak smell of garlic. Gill trama of elements 150-500µm long and persistently pale to ± white gills (all similar species have coloured gills with elements only to c.100µm)
Spores 7-11x4.5-6. Damp places on acid soils, esp. with Sphagnum or Calluna. One of the earliest species, from June (Boertmann). Described 1974. Reported as British in Orton 1984, p.583. Before then probably usually recorded as miniata. Probably not uncommon in upland areas.
helobia (Arnolds) Bon B135, BK87, C1542
Syn. miniata s.auct. (? s.NCL) BK92, C674?, RP63?
Syn. H.miniatoalbus s.Moller, see key in Orton 1960 (not then British), a name applied to forms with pure white gills

Subgenus Pseudohygrocybe Bon

Gill trama somewhat less regular than in sg. Hygrocybe and of much shorter elements, usually under 200µm long. Cap usually convex to broadly umbonate, in some species often depressed or even umbilicate. Gills usually broadly attached (over 2/3 their width).

Acutely conical caps are common in fornicata (pale grey), and can occur in eg raei (small, red, and bitter). A few species are often broadly umbonate and have narrowly attached gills (H.punicea, H.aurantiosplendens, H.splendidissima).

1. Section Neohygrocybe Herink
   = Tristes of K&R, Singer, C&D

1.1 Subsection Ovinae (= Section Olidae in Bon)

Medium to large, dark grey-brown grassland species. All now rather rare in Britain, mostly in the north and west. All Category B or C on the provisional European Red Data List

a) Smell often of ammonia; spores inamyloid

Bruising red then black like Russula nigricans; often with strong ammonia smell; whole fr.body v.dark; gills greyish to blackish brown
  Cap 2-8cm (Orton), but 8-12cm (Bon); spores broad 7-9(-10)x5-6.5(-7)
  Not uncommon fide Orton, but only two recs in last 30 years at K, both from Gaitbarrows, Lancs. More at E?
  ovina (Bull.:Fr.) Kühner
    B79, BK96, Bon113, C1107, CD231, DD114, L166E, MJ1, RP61
  ?Syn. H.nitiosus s.NCL p.p., distinguished as paler, esp. in the gills, and with slightly narrower spores

Very similar but paler; gills whitish to cream; stem whitish to ochraceous
  Desc. from the Faeroes. See NM for more details
  ingrata Jensen & Moller (-FAN) B77, Bon113, C1954?, RP61 (nitrata)
  Syn. H.nitiosus s.auct. and ? s.NCL p.p. 4 recs. so named at K may be either this or ovina
  Broader spores than last fide Bon, but no difference for Boertmann

Again very similar, but not bruising red, at most slowly blackening
  Always with strong ammonia smell. Calcifuge. Not uncommon fide Rea
  nitrata (Pers.) Wünsche AA3/11, B75, BK94 (murinacea), C662?, L165E [Exc. RP61 = ingrata]
  Syn. murinacea s.Moser

b) Smell meally, usually strong; spores amyloid (!)

Very slowly bruising red as above; spores, as well as being amyloid, are smaller than in the species above, 6-8x3-4
  Can grow very large, 5-15cm, but greatly resembles the Ovinae
  Porpoloma metapodium (Fr.) Singer (-FAN) Bon163, C1103, Md830, MJ1
  Syn. Hygrophorus m. in NCL, Hygrocybe m. in Moser
  [Placed by Orton & Watling 1969 in a section of its own, Amylohygrocybe, within Hygrocybe, but now excluded from the genus entirely. Will eventually be described in FAN in the tribe Tricholomateae]

1.2 Subsection Fornicatae
  Not separated for Boertmann, but a section on its own for Arnolds, who makes the Ovinae a subsection of the Coccineae

Cap dry to subviscid, smooth, whitish to grey brown; stipe dry

Here treated as a single species, following both Arnolds and Boertmann. "In the present concept a rather variable taxon, especially in the colour of the pileus and the size and shape of the spores" FAN. Bon 1976 distinguishes four species: fornicata, clivalis, streptopus and distans, based on variations in cap colour and shape, said to be correlated with spore size and ecology.

Cap 2-5cm, dry, whitish except at disc in the type var., ± conical, margin often eventually revolute (whence the name 'fornicata' = arched). Spores from 5.5-6.5x4-4.5 in some collections to 7-8.5x4.5-5.5 in others
  Chiefly in Scotland (Bon), born out by the mainly old recs at K.
  Usually (always?) on calcareous soils
  fornicata (Fr.) Singer B73, Bon113, C1104, CD230
  Syn. clivalis of Rea, NCL, though 'plainly different' for Orton in his 1960 key (with yellowish tints, spores only 5-6x3-4)
  ?Syn. lepidopus, similar but scaly, see Excluded Species

Cap largely pale grey to pale brown ("differing mainly in darker pileus colours" FAN). Not distinguished in NCL or by Boertmann
  fornicata v.streptopus (Fr.) Arnolds B73, Bon113, C669, L165C
  Syn. fornicata s.K&R. A distinct species streptopus for Moser
  Seemingly the commoner form in Britain, though both occur.

Similar appearance, but smell meally; spores strongly amyloid
  In calcareous alpine pastures
    [Porpoloma pes-caprae (Fr.) Singer] BK398, C1020, CD465, MJ1

2. Section Glutinosae Kühner

Cap and stipe both very glutinous (exception: dry cap in irrigata) Small species with caps under 5cm (rarely larger in H.unguinosa). Clamps often lacking or confined to medallion clamps at the base of basidia (most other Hygrocybe spp. have clamps).

a) Gills without a viscid edge, usually at most broadly adnate

Cap greyish, 3-6cm, 'smeared with dense fuliginous gluten' (Rea)
  The largest of the Glutinosae. The name means 'oily'. Common
  unguinosa (Fr.) P.Karst.
    B89, BK102, Bon113, C1533, CD229, L168I, MJ1, RP60 (dry and pale)
  Syn. irrigata s.Boertmann

Strongly resembling H.unguinosa, except in the dry cap (for Boertmann not worth distinguishing, he uses this earlier name in place of unguinosa)
  irrigata (Pers.:Fr.) Bon
  1) Accepted by Arnolds, who cites Cke 903(919). He writes: "may only be a form of unguinosa in which the pileipellis is reduced or washed away in part. However such variants have not been observed in related species such as H.laeta or H.psittacina. Apparently v.rare"
  2) Included on the strength of a collection recently reported from Wales (Rotheroe, Myc. 9:107,1995). No other convincing material at K

3) In Rea together with another doubtful unguinosus relative, H.clarkii, with viscid cap and scaly stipe
4) 'excluded pending clearer definition but possibly distinct' (NCL)

Cap 1-3(-5)cm, normally with a mix of green and yellow colours when fresh, but often ageing pale brown, rarely with violaceous tints (see B81, MJ2). Some green normally persists at stipe apex even if absent/faded elsewhere
Spores 7-10x4-6. Common
psittacina (Schaeff.:Fr.) P.Kumm.
B81, BK98, Bon103, C228, CD228, DD115, MJ2, RP64

Cap and stipe initially rich red-brown, drying pale with olive tones. Gills often rose pink. Differing little from psittacina except in colour, and thus reduced to a variety by Boertmann
Uncommon or overlooked. 'Very beautiful, densely gregarious' Massee
perplexa (Smith & Hesler) Arnolds B83, Bon113, C1534 (sciophana), CD225
Syn. sciophana s.NCL, K&R, Moser
?Syn. H.sciophanoides Rea = sciophana s.Cooke (see Excluded Species)

b) Gills ± arcuate/decurrent, with a viscid edge
Both species can have a musty smell (esp. when kept in a box)

Cap 1-3(-4)cm, pale tawny to flesh coloured; smell ± of burnt rubber
Cap flesh thin, margin pellucid/striate. Stipe apex often ± olive (distinctly green in f.pseudopsittacina Bon). Spores 6-9x4-5. Common in heathland, often with bracken, also in grass and on moors
laeta (Pers.:Fr.) P.Kumm.
B85, Bon113, C1105, CD226, DD118, L168F,F1, MJ2, RP64
NB. Old psittacina can easily be confused with laeta, but usually has somewhat larger spores

As last but cap bright yellow
Mostly boreal/arctic/alpine. Distinguished from next eg by habitat, persistently yellow cap and narrower spores. Recorded from Lanarkshire, Clyde Valley, c.1992 fide Silverside (pers. comm.)
laeta v.flava Boertm. AA3/9, B87

Cap 0.7-2.5cm, egg-yolk yellow (the name means this) drying whitish; gills deep yellow, arcuate/decurrent; spores broad, 6-8x5-6.5
Fr.body very fragile, usually soon umbilicate
'In damp mossy grass. Uncommon' (Orton), esp. with Juniper (Boertmann), 'on sand, favours acid soils' (C&D)
vitellina (Fr.) P.Karst. s.Boertmann B91, CD227 (luteolaeta), RP64
[Exc. MJ12 = ceracea fide Boertmann]
Syn. luteolaeta Arnolds, a name he introduced to distinguish his concept from that of Orton 1964, which had been described with a fertile gill edge and no smell. It is not clear if these are really distinct. If they are, then both occur in Britain: a collection by Malcolm Storey from Wilts 1984 had the smell and gelatinous gill-edge of Arnolds' then unpublished species; Storey similarly regarded it as distinct and deposited it at E as H.microlaeta nom.prov.

Note: RP, K&R and Moser all give spores under 5µm wide for vitellina, suggesting confusion with other species. Orton (1964) p.52 clarified his concept and distinguished it from that of Moller (a boreal/alpine species now = citrinopallida). He maintained his 1960 view that Rea's much disputed H.citrinus is a probable synonym. However the treatment in Rea 1922 suggests it is distinct (?= H.glutinipes of this account).

3. Section Coccineae Fayod

Cap dry to subviscid, smooth or squamulose; stipe dry and usually smooth (exception: stipe moist in H.insipida s.l., included here by Boertmann)

3.1 Subsection Coccineae (cap distinctly gelatinous or viscid)

a) usually distinctly umbonate, gills only narrowly adnate

Species resembling sg.Hygrocybe, where they are keyed by both Orton and Moser, but differing in the short gill trama elements

Robust, in general the largest Hygrocybe, cap 3-10(-15)cm, deep blood-red (the meaning of 'punicea') or duller brownish red, paling with age; stem coarsely fibrillose, yellow or flushed red; flesh and stem base ± white
Spores 8-10x4-6. Common on slightly acid grassland and heathland
punicea (Fr.:Fr.) P.Kumm.
B129, BK99, Bon107, C229, CD204, DD123, L167G, MJ15, RP62

Medium, cap 2-5cm, orange-red when young (pure yellow in f.luteosplendens Bon), soon fading patchily to chrome yellow
Spores 7-9(-10)x4-5, constricted in some views. In the field easily confused with the H.persistens group. Small faded punicea can also look similar, differing in the fibrillose stipe and slightly larger less constricted spores. Compare also quieta with similar spores but a less viscid cap and an oily smell. Not well known. 'Not uncommon and widely spread' Orton. 7 widespread British recs at K. Possibly confined to calcareous soils. Rare fide Boertmann, Cat.B on provisional Euro. Red Data List
aurantiosplendens Haller B131, CD206
[Exc. C1114, not cited by Arnolds, "maybe chlorophana" Boertmann]
See desc. Orton 1960 p.261

b) red to orange species with broadly attached gills

Cap 1.5-5.5cm, bright red to blood red, ± viscid; spores 7-11x4-6
Differs in the field from small punicea in gills more broadly attached, cap usually flatter (though a v.umbonata Herink has been described), and in flesh orange to red. Common
coccinea (Schaeff.:Fr.) P.Kumm.
B117, BK83 (+ front cover), Bon109, C670, CD208, L168G, RP62
[+ MJ12 (insipida), but not DD124 (probably splendidissima)]

"Looks very much like a small, rather orange and discolouring H.coccinea" (Boertmann). Spores somewhat smaller 7.5-9x4-5, in part constricted
Distinguished chiefly by the spores. Ecology not yet clarified
marchii (Bres.) Singer s.Boertmann B119, Bon109?, CD209
[Exc. (fide Boertmann) BK91=?, C1537=?, RP62=reidii]
non s.NCL, Reid + auct.mult. = reidii
[Recently reported by Watling from Shetland, but almost all other British records are likely to be of reidii (cap not greasy)]

Similar but arctic/alpine. Bitter taste when well chewed
Known from Norway, Greenland and the French alps
[salicis-herbaceae Kühner] (-FAN) B127, CD216

c) waxy yellow species

Cap 0.5-3(-5)cm; fr-body yellow throughout
Spores narrow, 6.5-8x3-4, often constricted. Common fide Rea, probably correctly, but easily confused with other species. 'Not uncommon' Orton
ceracea (Fr.:Fr.) P.Kumm.
B121, CD211, CD213 + MJ12 (both vitellina), RP64, W&D34 (cited in FAN)
Syn. citrina Rea s.auct. BK82, L167A=L&H79 (both fide Boertmann)
ceracea f.rubella, Bon109, is a rare orange form (not known in Britain?)
paraceracea Bon, CD212, more robust, moist stipe, somewhat larger spores - as yet unknown to Boertmann
[If stipe at all viscid and yellow colour tends to fade see next]

d) small red (esp. when young) to yellow viscid species, stipe moist (Insipidae of Bon, Glutinosae p.p. for Arnolds)

Cap 1-3(-4)cm, at most broadly umbonate; spores 6-7.5x3-4 when 4-spored
Originally described by Lange as a mild variety of the bitter reai. Colours very variable, often yellow to reddish orange, but sometimes scarlet when young. "Red colours very fugacious" Orton. Common (Orton, 1960). Fairly common throughout Britain in pastures (Bon)
insipida (J.Lange) Moser B123 + B125, Bon109?, L168C
[Exc. MJ12=coccinea (fide Boertmann)]
?Syn. ortoniana Bon intended to = glutinipes s.Orton 1960 key
?Syn. minutula (Peck) Murrill s.Bon, 4-spored, spores larger 7-10x4-6, reported from France (may be this fide Boertmann)
[Cap 'soon discolouring chrome-yellow from centre, but red sometimes persisting at margin in places' (Orton). Contradicted by 'cap typically with orange or yellow margin' (Bon), and so illustrated]

Cap smaller (0.5-2cm), when young scarlet and very viscid; gills paler, almost white; stem apex remaining bright red when old
Spores smaller for Orton, 5-7x2.5-3.5, but Boertmann finds no difference, and does not recognise a separate taxon even at form level. Not uncommon fide Orton. Also reported from France, Norway and ?Italy
insipida f.subminutula (Murrill) (-FAN) Bon109 C2438, CD217, MJ3?
See desc. (as species) Orton 1960, p.268
[It does not appear to be clearly established whether this European concept is the same as Murrill's American species]

Note: The colours of the paintings of subminutula in Bon and C&D appear exaggerated until compared with the excellent Cetto photo. The three together, supported by Orton's description, look like a taxon worth distinguishing from Boertmann's admittedly variable H.insipida. Even if the spore differences are not born out, they seem worthy of recognition as a form, and are here listed as such.

Taste very bitter; cap 0.5-2(-3)cm, sometimes umbonate to papillate; spores ± constricted or basally swollen, 7-9.5x4-5.5
"In the field more similar to miniata than to other Insipidae" FAN, and not assigned to a subsection by Boertmann. Placed here for convenience. Rather uncommon (Bon). Not uncommon (Orton). Under-recorded?
reai (Maire) J.Lange Bon109, CD214, DD119, L168A, MJ4
[Exc. BK100=?, C1108=? fide Boertmann]
Syn. mucronella (Fr.) P.Karst. s.Lange, Moser, Boertmann, B133, CD215? but non K&R, non Rea (better rejected as a nom.dub.?)
Spelling sometimes 'corrected' to reae (eg. Bon, C&D, NM)

3.2 Subsection Siccae

Subsection erected by Boertmann 1996 for species intermediate between the Coccineae with a smooth gelatinised pileus and the Squamulosae with a dry scurfy pileus. Cap dry or slightly greasy when young, ± smooth, ie. with an ungelatinised cutis of repent hyphae

a) Species with a sweet or oily smell

Like punicea, but cap drier, characteristically crimson-red, build usually more slender, stem usually smoother, flesh and stem base more distinctly yellow (even 'bright orange' fide Bon). Honey smell when drying
'Acid pastures and heaths' Bon. 'Probably not uncommon' Orton
splendidissima (Orton) Svrcek (-FAN) B95, Bon107, C1535, CD205, MJ8
Type desc. Orton 1960, p.265
A form of punicea fide Reid in FRIC.6, 1972. FAN is non-committal: "a closely related taxon". Quite distinct for Boertmann.

Best recognised by the fairly strong sickly sweet smell ('of honey' auct.) released when a fresh stipe is vigorously rubbed or squashed
Spores 6-8.5x3.5-5, at most 20% weakly constricted. Common
reidii Kühner B93, Bon111, C1539, CD220, MJ10 (quieta)
[Exc. MJ9, too scurfy, = miniata fide Boertmann]
Syn. marchii s.Reid + auct.mult. FRIC18a, RP63
"Intermediate between the subsections Coccineae and Squamulosae. It is easily confused with H.marchii and with almost glabrous basidiocarps of H.miniata, but it is well characterised by the peculiar smell, the trichodermal pileipellis with narrow hyphae, and, with regard to H.miniata, by the shape of the spores (not broader in frontal view)" FAN

Cap chrome yellow to orange, ± buttery/waxy when moist. Smell oily, as of Lactarius quietus, when bruised, or 'soapy or of washing' (Bon)
Size variable, cap 1-8cm. Colour variable, from lemon to dull orange, sometimes developing olive/greenish tones with age. Gills often more orange than cap. Spores 7-10x4-5, often constricted
quieta (Kühner) Singer B99, BK95 (obrussea), Bon109, C1115, CD210
[Exc. MJ10 = reidii fide Boertmann]
See desc. Hora & Orton 1955, p.403
Syn. obrussea s.Arnolds
NB. aurantiosplendens is similar with similar spores, but lacks the smell; usually more viscid and more acutely umbonate

b) No smell

Cap 0.5-3cm, usually dark red, but a yellow form is known, ± blackish at disc, with narrow yellow margin, v.fragile
Reported in Watling & Rotheroe 1989 from Quendale, Shetland Sept. 1985
Otherwise known only in Holland and Scandinavia in unimproved grassland
phaeococcinea (Arnolds) Bon B97, CD207

Cap 0.5-3.5cm, reddish, like a dry insipida, but spores more constricted
Little known, but eg in Danish dunes with Salix repens, and in sandy grassland in Holland
[constrictospora Arnolds] B101
"May be confused in the field with weakly squamulose forms of H.miniata. However the shape of the spores and structure of the pileipellis are quite different" FAN

c) Caps minute, orange, hygrophanous; spores very small

Cap 3-8mm, orange drying pale; spores 4-5x3-4
Desc. from Jamaica, but not recorded there since. Common in Japan and New Zealand. First European record Bedgebury Pinetum, Kent 1969, on a steep ditch bank among bryophytes, det. Reid. A second record Pembrey, S.Wales 1980, from a 50 year old plantation of Lawson's Cypress, also det. Reid. Still seemingly unknown elsewhere in Europe
aurantia Murrill (-FAN) FRIC41b
See desc. by Reid in FRIC.6, 1972

3.3 Subsection Squamulosae

Cap dry, soon disrupting finely scaly/scurfy, at least at centre, i.e. in part with trichoderm. Colours red to yellow

a) Gills adnate, at most with a decurrent tooth

Small, bright red; gills normally pale; faint scent of garlic; gill trama of elements 100-500µm long.....See above Sg. Hygrocybe, H.helobia

Spores large, 9-12x5-7, usually at least half ± constricted in the middle; basidia 8-10.5µm wide. Otherwise v.like miniata, and named with reference to strangulata Orton, which = miniata (see next). Apparently uncommon. In dune slacks, but also eg ditches in conifer plantations. Also arctic/alpine. Type from Dorset
substrangulata (Orton) Orton & Watling (-FAN) B107
[Exc. C1538=?, pileus smooth and greasy]
Type desc. Orton 1960, p.269
Syn. biminiata Kühn.
[v.rhodophylla, B109, deep red, in Greenland and the French alps]
[H.constrictospora, see previous subsection, can appear similar, but has spores only 6.5-10x3.5-5, and basidia only 6-8µm wide]

Gills red or yellow; cap bright red or orange, 1-3.5cm (but 2-5cm fide Bon), bleaching pale yellow in parts with age; spores 6-9(-10)x4-6.5, ellipsoid, ovoid or oblong in side view, Q = (1.4-)1.5-1.75, most spores broader in face view with a swollen base (pear-shaped)
Common, esp. in somewhat acid heathland
miniata (Fr.:Fr.) P.Kumm. B103, Bon111, CD221, DD125, MJ9
Syn. H.strangulatus Orton Bon111, FRIC18b, RP63
Desc. (type) Orton 1960 p.266; Reid in FRIC.3, 1968
Exc. miniata s.auct.mult. (?inc. NCL) = helobia: BK92, C674, RP63?
A name formerly attached to any small dry reddish Hygrocybe; see further discussion in Note p.21

Differing only(?) in orange yellow colour of all parts, and thus for Boertmann not worth a name
miniata v.mollis (Berk. & Broome) Arnolds
B103 (lower), Bon111 (moseri)
[Exc. BK93 ?=calciphila fide Boertmann, C2797 ?=lepida]
Syn. H.moseri Bon
?Syn. turunda s.Arnolds in FAN and s.Moser fide Boertmann
Exc. H.mollis s.NCL (accepted here by Arnolds, but spores unconstricted)
?=calciphila

Often differing from miniata in smoother cap and light yellow gills (at least when young - more orange later). Better distinguished by the spores ellipsoid to ovoid, Q = 1.25-1.45, not swollen in face view. Also differing sharply in habitat: dry calcareous grassland (esp. upland)
One rec. at K from Surrey 1992 det. Laessoe
calciphila Arnolds B105, BK93? (miniata v.mollis), CD219
[Exc. BK79 =? fide Boertmann]
?Syn. H.mollis s.NCL (see Orton 1960 key) Cke 910(921)B
[H.miniata s.Orton is widely described as a syn. of calciphila, but this is a view not accepted here, see note p.21]

b) Gills ± strongly arcuate/decurrent

Three small species, esp. in moss on fairly acid soils, all rather similar. Spores around 9.5-11.5x5.5-7, but variable. Boertmann finds occasional intermediates

Cap 1-2(-3)cm. Squamules concolorous
Stipe long and slender. Named for the chanterelle gills. Not uncommon in acid mossy grass or sometimes in sphagnum
cantharellus (Schwein.) Murrill
B111, L167B, MJ10, C1112, C1540? (turunda), RP63
Syn. lepida Arnolds BK90, CD222
Syn. turundus v.lepidus in Rea
?Syn. mucronellus s.Cooke, Rea non al. (see Excluded Species)
NB.1 lepida here means 'charming' fide Rea, rather than 'scaly'
NB.2 lepida s.Bon (Bon111) with cap 4-7cm and spores 11x8 must be some other species. Its spores are shown slightly warted

Cap and scales ± orange, but the scales darkening with age
Uncommon in Britain. Orton 1960 cites only collections from Scotland in damp moss or mossy soil, but not sphagnum. Since reported from eg Ilkley Moor, Warwicks, Windsor, Bedgebury (mostly det. Reid)
turunda (Fr.:Fr.) P.Karst. (-FAN) B113, Bon111?, CD223
[Exc. C1540 probably = cantharellus fide Boertmann]
Desc. Orton 1960, p.270
Exc. turunda s.Lange, K&R = coccineocrenata
Exc. turunda s.Moser, Arnolds ?= miniata v.mollis

Cap ± scarlet, 1-3cm, with darker scales, margin often crenate; gills usually very strongly decurrent
In wet boggy places, esp. under Molinia or with sphagnum. Only the type and one other collection at K
coccineocrenata (Orton) Moser
B115, BK101? (turunda v.sphagnophila), Bon111, C1541, CD224
Syn. turunda s.Lange, K&R etc (non NCL, nec Arnolds) L168H = L&H79
Type desc. Orton 1960, p.262
[Arnolds also recognises a v.sphagnophila with paler scales, less decurrent gills and margin not crenate; this is ignored by Boertmann]

A note on Hygrocybe miniata

In preparing this account it was in general easy to relate the treatment by Orton in NCL to the later ones by Arnolds and by Boertmann. They both use a broad species concept, while Orton abhors forms and varieties, so naturally there are differences, but it is usually clear what taxa are being discussed. The major exception was the H.miniata complex.

In 1960 when NCL was published there was no surviving type material of H.miniata. Orton's NCL concept was of a rather uncommon species with bright red scaly caps and unconstricted spores. In NCL he also included a newly described species, H.strangulatus, common in heathland, with caps at most minutely scurfy and constricted spores. In 1986 Arnolds neotypified H.miniata, using material from Fries's type locality (Femsjö). The material he chose proved identical with an isotype of Orton's strangulata. Now that Arnolds' concept is generally accepted, strangulata perforce becomes a synonym of miniata.

This makes sense, since a species as common as strangulata should have had a name before 1960. But it leaves some unease that the epithet 'miniata' which should mean 'painted with red lead' has been attached to a species that is more usually orange-red. It also raises the question of what to call Orton's miniata. Arnolds had described a rather similar uncommon species, H.calciphila. In correspondence with Orton he established that many of Orton's miniata were from calcareous soil, and (Arnolds 1986b) thought it likely these were identical. But in Arnolds 1986a (written later?) he writes "Orton's collections of H.miniata studied by me (preserved at E) do not contain H.calciphila" (one probably and two certainly he found to be indeed miniata). Nevertheless for some reason in FAN he gives Hygrophorus miniatus s.Orton as a syn. of H.calciphila, a view repeated in B&K, and most recently by Boertmann.

Arnolds found that material of H.strangulata at E was heterogeneous. As well as H.miniata it included H.marchii and possibly H.constrictospora (not otherwise recognised in Britain). The material of H.miniata may well be similarly heterogeneous and contain some H.calciphila, but this does not seem to have been established. H.calciphila is included here as British on the strength of a Surrey collection det. Laessoe, and not as miniata s.Orton.

My personal view is that Orton's H.miniata is based on collections of H.helobia with coloured gills. This is a bright red scurfy upland species with unconstricted spores, rather uncommon in Britain and otherwise unrepresented in Orton's 1960 key except in its white-gilled form as H.miniato-albus Pat. There must also be doubt about Orton's concept of H.mollis, again with unconstricted spores, and thus not Arnolds' H.miniata v.mollis (which Boertmann treats as only a colour form of H.mimiata). From Orton's 1960 key it seems plausible that it is his H.mollis rather than his H.miniata that corresponds to the then undescribed H.calciphila Arnolds.

GENUS CAMAROPHYLLOPSIS Herink 1958

= Hygrotrama Singer (used by Moser, published months later)
= Appendice aux Hygrophores (Espèces de position systématique discutable) of K&R

With the decurrent gills, dry caps and dull colours of Hygrocybe sg. Cuphophyllus, but cap cuticle wholly or partially hymeniform. Clamps absent in all the European species.

Small species, cap 0.5-3 cm, in scrub or sometimes more open grassland. None are common in Britain or elsewhere, but they have been noted as often occurring together. So if any species is found the area within a few metres should be carefully searched for others. See Printz & Laessoe, Svampe 14:83-92,1986 (in Danish) for good photos of all five species (which all occur together at one Danish site).

Subgenus Camarophyllopsis
= Hygrocybe sect. Camarophyllopsis of Orton & Watling 1969
(the one British species included in Hygrophorus sg. Hygrocybe in NCL)

Cap cuticle mainly of erect uninflated hyphae. Some pyriform elements also present, but not abundant and lost with age

Cap grey-brown, 1-3cm, dry, minutely tomentose/velvety under a lens; spores subglobose 3-4.5x2.5-3.5 (too large in Moser)
Gills thinner and paler than in other species, first white, then light brown, broadly adnate, then decurrent. "Resembling H.nitratus in colour and habit... a rather tough little fungus" Orton. Usually in fairly open calcareous grassland
schulzeri (Bres.) Herink FRIC49c
Desc. Orton 1960, p.264
[With Larix fide K&R, true of the type collection, but atypical]

Subgenus Hodophyllus (R.Heim) Arnolds
= Hygrophorus sg. Camarophyllus s.NCL p.p.
= Hygrocybe sect. Hygrotrama of Orton & Watling 1969

Cap cuticle ± entirely hymeniform, ie formed of a pallisade of pyriform cells. Caps 0.5-2(-2.5)cm. Gills strongly decurrent, eventually chocolate brown

The species are very similar, each having only a single strong character to distinguish it from the rest. Spores small, subglobose, mostly in the range 4-6x3.5-4.5, but can be larger in foetens

Smell very strong, unpleasant, foetid (like Tricholoma sulphureum or Thelephora palmata for Moser)
"known by its small size, umber cap and abominable smell" Massee
foetens (Phillips ex Berk. & Broome) Arnolds Bon171, L166H, MJ1
Syn. Omphalia abhorrens Berk. & Broome

Upper part of stipe covered in small grey-brown scales
"amongst bracken in woods and on heaths" W&D
atropuncta (Pers.:Fr.) Arnolds
Bon171, C2798, CD624, FRIC49d, L166A, W&D29

Stipe bright yellow to brownish yellow at least at apex, later browning
On basic clay soils fide Orton
micacea (Berk. & Broome) Arnolds MJ2
Syn. phaeoxantha in Moser
See desc. Orton 1988 p.559, where combined as Hygrocybe m.

Without yellow tones, cap and stipe pale grey to brown, blackening with age
Recs at K from Maddingley Woods, Cambs 1955 and Box Hill, Surrey 1993
hymenocephala (Smith & Hesler) Arnolds (-FAN) MJ1 (rather pale?)
See desc. Hora & Orton 1955 p.402
?Syn. phaeophylla (Romagn.) Arnolds, MJ2, colours paler, spores smaller?
(included in FAN, where the differences are discussed)
[Rather weakly separated from micacea]

GENUS DERMOLOMA (J.Lange) Singer 1951

Species differing from Hygrocybe in having a hymeniform cap cuticle, giving a dry, velvety, easily cracking cap. Basidia rather short for Hygrocybeae, hence previously placed elsewhere (eg by Kuhner near Tricholoma, and by Singer near Hydropus among the Mycena relatives).

The most closely related genus appears to be Camarophyllopsis, with a similar cuticle. They may be separated as follows:
Gills broadly adnate to decurrent; clamps absent; spores inamyloid
Camarophyllopsis
Gills adnexed to sinuate; clamps present (except in occasional 2-spored collections); spores amyloid or not
Dermoloma

Caps grey to brown. Smell meally, at least when cut or bruised, in all the British species. In unimproved grassland or wood margins, but not known in British dunes.

Orton 1980 gives a key to 6 British species. The treatment here follows Arnolds in FAN Vol.3, where these are treated as 3 species and a variety.

Spores inamyloid
Cap 1-6cm, light or dark grey brown, scarcely hygrophanous. Spores 4.5-7.5x3-5. Much the commonest British species
cuneifolium (Fr.:Fr.) Bon BK206, CD641, L31B, MJ1, Persoonia 14:520
Syn. atrocinereum (Pers.) Orton Bon171, C1928, CD640, MJ1, RH365
This name used in K&R, NCL. A distinct species in Orton 1980, Moser (used for larger dark grey collections)
Syn. fuscobrunneum Orton (see type desc. Orton 1980 p.326)
Defined for collections with dark brown cap and ± brown stipe
This is s.Orton 1980, non s.K&R, NCL = pseudocuneifolium
[var.punctipes Arnolds, known from Netherlands and France differs only in a finely punctate stipe apex]
[D.intermedium Bon (Doc.Myc.9(35):42,1979) is larger, caps 5-8cm]

The remaining species all have amyloid spores, and are all uncommon:

Small, cap 0.7-2.5cm, usually dark brown when moist, but hygrophanous; stipe 1-3mm wide; gills usually dark; spores 6-7.5x4-5, ellipsoid, Q = 1.5-1.7
Mostly on poor ± calc. soils (by contrast Arnolds in NM says 'rich soil in decid. forests'). Common fide Bon, but rare for Orton, Arnolds.
Chalk downs, Surrey, Hants + limestone in Devon
pseudocuneifolium Herink ex Bon
Bon171?, C1019 (Trich. cuneifolium), Md832, MJ2
See desc. Orton 1980 p.328
Syn. cuneifolium s.K&R, NCL

Larger, paler, ivory to beige, cap 1.5-5cm, stipe 2-8mm wide; gills and stipe whitish; spores shorter, 5-6x3.5-5, broadly ellipsoid to subglobose, Q = 1.2-1.4
Uncommon, recs from calc. woods Somerset, Hants, Devon
josserandii Dennis & P.D.Orton C1468? (pragensis)
Type desc. in NCL Part III, 1960, where considered = Tricholoma hygrophorus Joss. (nom.nud.)
Syn. D.hygrophorus and D.pragensis (both distinct in Moser)
Syn. D.glauconitens s.Bon, C&D

As last but cap dark grey-brown, gills and stipe tinged brownish
Indistinguishable from D.cuneifolium in the field (also resembles Camarophyllopsis schulzeri). Wrongly desc. in C&D as always small.
Uncommon. Known to Orton from grassland in Devon, other recs at K from Glouc., Hants, Kent. Also recorded from Mull
josserandii v.phaeopodium (P.D.Orton) Arnolds CD642, MJ2? (pragensis)
Type desc. (as species) Orton 1980 p.327

A further non-British species mentioned in C&D is somewhat puzzling:

D.atrobrunneum (Dennis) Singer ex Bon (CD643), illustrated with ± black caps, not mentioned in FAN etc. Desc. from Trinidad, no smell, spores amyloid fide Singer, inamyloid fide Orton.

Excluded Species of Hygrophorus/Hygrocybe

1. Doubtful Species with British Records

Smaller ± look-alike of punicea. Cap 1.5-5.5cm, usually distinctly papillate, yellowing at margin with age
Not well understood ('insufficienrly known' Boertmann). Included in Orton 1960 key and FAN key. Believed to have been reported in Scotland
acutopunicea R.Haller & F.H.Moller (-FAN) BK78, C1111 (acuta), C2445
But the illustrations cited here look like three different species!

Cap pale ochraceous, c.4cm, obtuse; cap and lower 3/4 of stipe finely scaly; spores subglobose 5-5.5x4-4.5 (type desc.), 5-7x4-5.5 (Orton)
Gills sinuate/adnate, distant. In grassland
lepidopus (Rea) Orton & Watling
Type desc. TBMS 12:214,1927 Never recollected? Accepted in NCL
The type (a single fr.body) and a Rea watercolour probably of the type are the only material at K. The scales remain clearly visible, but in other respects the description is consistent with fornicatus

Minute (2-8mm), scarlet to yellow becoming hoary; gills yellow, triangular
Described in Rea with implausible small globose spores 3x2-3
mucronella (Fr.) P.Karst s.Cooke, Rea non al. Cke 905(937)B
non s.Lange, Moser (= reai), nec s.K&R (= subpapillata)
'doubtful' (NCL index). No material at K, but Rea's watercolour of his collection suggests a small lepida

Medium to large, yellow to gold
obrussea (Fr.) Wünsche
The name means 'pure gold' and has been widely applied:
s.Lange = flavescens, s.NCL = citrinovirens, s.Arnolds = quieta

With paler, pinker colours and smaller spores than sciophana (ie perplexa)
No type material known? Painting by Rea at K (of type?) suggests a thin watery depauperate laeta. But accepted in NCL
sciophanoides (Rea) Orton & Watling
Intended as a nom. nov. for sciophana s.Cooke 905(937)A. "Seems to be a related taxon [to perplexa]" Arnolds. "Possibly represents an aberrant or dried out form of H.psittacina" Boertmann.
Only collection at K from the lawn of a University Hall, Bangor 1950 det. Pearson

Small, resembling insipida, not discussed in FAN or by Boertmann
subminiata Murrill Mycologia 3:198,1911
Two unpublished collections at K: a) Orton, Surrey 1951, who thought ?insipida or ?sp. nov., but assigned here by Pearson. b) in sphagnum, Ilkley Moor, 1959, det. Reid

2. Further very doubtful species included in Hygrophorus in Rea, though mostly unknown to Rea personally. None of these discussed by Boertmann:

clarkii (Berk. & Broome) W.G.Smith Cke 900(934) 'doubtful' NCL
'Large 9-10.5 cm' for Rea but only 1.5-2 inches for Massee.
?= unguinosa, but spores large, 10x6, and stipe dry. Material at K

connatus P.Karst. 'doubtful' NCL. a Clitocybe?
Cap 3-4cm, grey, silky; stipe grey, gills dark grey, decurrent; spores 7-8x4-5 pip-shaped; caespitose in woods. A Rea painting at K but no material

distans Berk. possibly = virginea fide NCL
Gills few, very distant. In woods. The type and only record at K looks like pratensis v.pallida. For Bon 1976 near fornicata

nitratus v.glauconitens Fr. 'Excluded pending clearer definition' NCL
Stiff woodland variety fide Rea
Two Berkeley collections at K.

obscuratus P.Karst. 'doubtful' NCL
Presumably a member of the Ovinae, reads like nitrata. None at K

turundus v.sphaerospora Rea 'suggests Laccaria bella' NCL
Spores warted! Survives only as a Rea painting of a turunda-like orange scaly Hygrocybe accompanied by a presumably extraneous Laccaria-like spore. L.bella (Pers.) Berk. & Broome is an orange yellow Laccaria described from rotten conifer wood distinguished by its foetid smell, but also with no material known to survive.

ventricosus Berk. & Broome Cke 897(901) ?= virginea fide NCL
Differs in the swollen stem. Type at K is a stout specimen suggesting pratensis v.pallida. For Parker-Rhodes (unpublished list) the flesh of H.ventricosus slowly reddens in Ethyl chlorostannate (!) (said to leave H.virgineus unchanged)

3. Other non-British species

The following is the only species listed in the English edition of Moser that has not been discussed elsewhere in this paper:

parvula (Peck) Murrill (-FAN) C1116?
For Moser a chrome/orange species near reidii, and Bon 1976 agrees "miniature d'H.marchii". But the Cetto illustration cited by Moser looks like H.cantharellus. Described from N.America, and common there fide Phillips (Mushrooms of N.America 1991) who pictures an utterly different species, apparently near H.glutinipes. For Boertmann the American species resembles a dry H.ceracea; he is unconvinced by European records.

KEYS TO GRASSLAND SPECIES OF LEPTONIA s.l.

Alick Henrici, July 1996

Covering species placed by Noordeloos in sgg. Alboleptonia, Leptonia, Omphaliopsis and Paraleptonia. A few mainly recently described species are included in [ ], although not yet recorded in Britain.

NB. These are very minimal simplistic keys, designed merely to alert readers to the range of species to be considered, and to lead quickly to a range of illustrations and descriptions that might lead to a more secure determination.

Most species lack clamps; where they do occur they are mentioned. Best seen in the narrow hyphae of the cap or stipe cuticle.

Abbreviations

BK = Breitenbach & Kränzlin Vol.4, C = Cetto, CD = Courtecuisse & Duhem, L = Lange, MJ = Moser & Jülich: Farbatlas, N = Noordeloos: Fungi Europaei Vol.5, RH = Ryman & Holmasen: Svampar, RP = Phillips

Noordeloos' illustrations are always cited and up to four others.

KEY A Pale species, caps white to cream, pink, yellow or greenish

I Cap and stipe white to cream (all with clamps)
- A Stipe short; smell strongly meally (sg.Paraleptonia)
  - 1 Cap cream to yellowish; often 2-spored, 9-12.5x6-9.....neglectum (Ecc.cancrina of NCL) C2734, L79D, MJ17, N71c
  - 2 Cap pure white; 4-spored
    - a Spores as last (? in sg. Claudopus).....rugosum (one Brit. rec. at K, Gait Barrows, Lancs) CD967, N72d
    - b Spores smaller, ± subglobose; clamps rare.....pallens (don't know why this is on British list)
- B Stipe elongated; smell none (sg.Alboleptonia) Widespread and common; spp. 8-11.5x6-9.....sericellum BK78, Bon189, CD959, N46a, RP116

II Cap pinkish
- A Cap and stipe rose pink; esp. in dunes with Salix repens.....roseum (rare in calc. grassland) BK71, Bon195, CD948, MJ14, N58c
- B Cap pink, stipe blue at least at base.....catalaunicum (uncommon, acid boreal/upland) BK16, Bon195, C2322, MJ13, N58b

III Cap cream to ochre yellow
- A Confusable with discoloured E.sericellum, but - clamps.....kervernii (collected by Noordeloos near Kindrogan) BK46, N76b
- B For other yellow to yellow-brown species, with cap at least partly translucently striate, see Key E

IV Cap and particularly stipe green, at least in part
- A Smelling of mice (inc. v.citrina Reid, ± yellow).....incana (fairly common on calc. soils) BK42, Bon195, CD947, N58a, RP116
- B Greenish tints can also occur in the stipe of E.exile and E.chloropolium, see below Key E

KEY B Species with a blue-black or violaceous blue gill edge
These are all closely related, differing mainly in colour.

I Cap deep blue or bluish green
- A Cap and stipe dark blue, young gills whitish or blue.....serrulatum
  (commonest Leptonia in Britain) BK82, Bon195, CD941, N52a, RP117
- B Cap paler greenish blue to olivaceus.....querquedula
  (2 or 3 British records, eg Mull) Bon195, C540, CD943, N58e

II Cap yellow-brown or lilac grey
- A Cap yellow- to rust-brown, translucently striate.....caesiocinctum
  (not uncommon in Scotland) BK14, C2324, CD942, MJ25, N52c
- B Cap pale pinkish lilac grey.....carneogriseum
  (boreal, only Brit. rec. Bk & Br type, Aberdeen 1865) BK15, N52b

KEY C Species with cap and stipe blue grey to deep blue to ± black
(Browner species also included here if with violaceous tints)

I Gills also blue (at least when young)
- A Stipe base with white tomentum; gill edge sterile, sometimes brown
  - 1 Cap entirely tomentose/squamulose.....chalybaeum v.chalybaeum
    (uncommon, mainly northern) BK19, C2729, CD944, MJ23, N53a
  - 2 Cap deeply translucently striate.....chalybaeum v.lazulinum
    (uncommon, mainly northern) BK20, C989, N53b, RH383, RP117
- B Stipe base with coloured tomentum; gill edge fertile
  - 1 Cap deep violet grey, papillate; tomentum orange-red...cruentatum
    (acid heathland, Fort William, Blair Atholl, Noordeloos 1983)
  - 2 Cap dark blue black; tomentum sulphur-yellow....cyaneoviridescens
    (only known from Orton's type, Glen Affric, 1958)

II Gills white when young, later ± pink, strongly contrasting with cap
- A Cap deeply translucently striate
  - 1 Minute (to 1cm), deep blue, spores large c.12-14x9-10....cyanulum
    (in moss, esp sphagnum, eg. Yorks + Inverness 1983) N54b
  - 2 Larger, violaceous brown, spores c.9x7.....[pseudocoelestinum]
    (eg with Molinia, widespread but rare in W.Europe) BK65, N54a
- B Cap not or weakly striate
  - 1 Cap and stipe violaceous grey
    - a Cap/stipe often fairly pale, gill edge sterile.....mougeotii
      (NU, calc. to basic soils) BK52, Bon195, C980, CD946, N56a
    - b Cap/stipe dark violaceous; gill edge fertile....nigroviolaceum
      (known only from a few Scottish recs.) Orton 1960 (type desc.)
  - 2 Cap and stipe dark blue to blue-black
    - a Gill edge fertile, cap blue-black.....atrocoeruleum
      (? not uncommon in Scotland fide Noordeloos) N56b
    - b Gill edge entirely sterile
      - * Cap dark black-blue.....corvinum
        (uncommon, poor grasslands) BK25, C1428, CD945, MJ24, N55
      - ** Cap brighter blue, fading to brown.....caeruleum
        (eg dunes with Salix repens) Orton 1960 (type desc.)
  - 3 Cap and stipe purple-black
    - a Cap almost glabrous, spores 11-14x8-10.....aethiops
      (esp. on peat, rare) BK6, N56c
    - b Cap more squamulose, spores only 9-10x6-7.....[melanochroum]
      (boreal/subalpine, rare, = aethiops s.K&R)

KEY D Stipe blue to steel-grey or violaceous, but cap brown or grey

I Stipe fibrillose, flocculose, scaly etc
- A With clamps (at least in the hymenium)
  - 1 Cap 1-4cm, spores 6-9 angled, + encrusting pigment.....lampropus
    (s.K&R, Noord. non NCL, uncommon) Bon195, C1864?, CD939, MJ20
  - 2 Cap 0.5-1.5cm, spores 5-6 angled, - encrusting pigment
    - a spores ellipsoid.....insidiosum
      (paratype collection, Noordeloos, Fort William)
    - b spores smaller, subglobose.....[juniperinum]
      (rich calc. soils, often among Juniper litter)
- B Totally lacking clamps
  - 1 Cap pale brown, stipe ± violaceus.....griseocyaneum
    (not uncommon in Scotland) BK36, C2327, MJ14, N63b, RH382
  - 2 Cap dark brown to nearly black
    - a Relatively robust species of acid heathland.....anatinum
      (uncommon, see desc. Orton 1960) CD951, N63a
    - b Small species; gill edge sterile.....coeruleoflocculosum
      (desc. by Noordeloos from Blair Atholl, also in dunes)

II Stipe smooth and polished (at least in the mid section)
- A Spores on average under 10µm long
  - 1 Gill edge fertile
    - a Yellow-brown, stipe pale blue (poor soil).....lividocyanulum
      (upland grassland) BK49, DD259, N60b
    - b Pink-brown, stipe deep blue (rich soil), habit omphalioid
      (sg.Omphaliopsis = L.leptonipes of NCL)...incarnatofuscescens
      (parks and gardens) BK43, Bon189, C1867, CD960, N85a
  - 2 Gill edge sterile
    - a Cap deeply striate.....[porphyrogriseum]
      (desc. from calc. grassland with Salix repens, Denmark)
    - b Cap scarcely striate.....[poliopus v.parvisporigerum]
      (in ± calc. soil, rare but widespread) BK62
- B Spores on average over 10µm long
  - 1 Gill edge fertile
    - a Stipe grey-violaceous; all/many basidia 2-spored....huijsmanii
      (mainly on rich basic soils) BK41, N87f
    - b Stipe steel-blue; 4-spored.....asprellum
      BK11, C2728, CD949, N60a, RH382
  - 2 Gill edge sterile
    - a Cap dark brown, scarcely striate
      - * Gill edge darker; stipe intensly blue..poliopus v.poliopus
        (locally not uncommon?) CD950, N62b
      - ** Gill edge concolorous; stipe paler.....poliopus v.discolor
        (widespread but rare, type from Perth, also the Burren)
    - b Cap paler brown, deeply striate
      - * Cap brown, not hygrophanous.....sodale
        (boreal/montane = lampropus s.NCL) BK84, C2326, N62a
      - ** Cap beige with pink tones, hygrophanous.....[mutabilipes]
        (lowland woods or grassland) BK53, N61