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NOTES ON SOME AGARICS FROM SCOTLAND

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ABSTRACT. Two new species are described: *Tricholoma sejunctoides* and *T. vinaceogriseum* and their relation to allied species is discussed. The new combination *Hygrocybe canescens* (Smith & Hesler) P. D. Orton is proposed and the species described. *Cortinarius* (*Telamonia*) *limonius* (Fr.: Fr.) Fr. is discussed and described, and descriptions are given of Scottish material of *Hebeloma cylindrosporum* Romagnesi, *Mycena purpureofusca* (Peck) Sacc., *Pholiota pinicola* Jacobsson, and *Tricholoma viridilutescens* Moser.

These notes describe a few new or critical agarics from Scotland, material of which is deposited in the Herbarium of the Royal Botanic Garden, Edinburgh (E). The species are arranged in alphabetical order of genera as in the 'New Check List of British Agarics and Boleti' (*Trans. Brit. mycol. Soc.,* Suppl.: 43:1–225, 1960) except that *Hygrocybe* is used instead of *Hygrophorus* subgenus *Hygrocybe*. Colours are as in the *Colour Identification Chart to the Flora of British Fungi,* HMSO, Edinburgh (1969).

CORTINARIUS

When I wrote The Genus Cortinarius: II (*Naturalist* (suppl.) 1958: 81–149, 1958) I had not learnt to distinguish *C. limonius* (Fr.: Fr.) Fr. from *C. callisteus* (Fr.) Fr. and had also confused *limonius* with *C. gentilis* (Fr.) Fr. I therefore gave a description of *callisteus* which was a mixture of *callisteus* and *limonius* and hereby retract that description. Since then Kühner (*Bull. Soc. Linn. Lyon* 29:212–221, 1960) has given a clear account of these two species which enables one to distinguish them more easily. His description of *limonius* agrees very well with my notes on this species from Scotland. I do not know of any definite evidence that *callisteus,* seemingly a species growing with spruce, is really British and I think it should be withdrawn from the British list; past records may well refer to *limonius* or to *C. speciosissimus* Kühner & Romagnesi, or if from deciduous woods to *C. tophaceus* (Fr.) Fr. On the other hand *limonius* is abundant under Caledonian pine in the Scottish Highlands and a description of Scottish material is given below. I know of no definite evidence that it occurs farther south in Britain.

Apart from the habitat distinction, *limonius* differs most clearly from *callisteus* and other similarly coloured taxa in having often rather large characteristically shaped sterile cells on the gill edge. It has a well-marked veil present on the cap as adpressed silky scales, appendiculate remnants at the cap margin, and, when fresh, on the stem as a well-marked floccose-scaly zone. It is slightly hygrophanous and is inodorous. On the other hand *callisteus* has the gill edge fertile, no conspicuous veil remnants but has darker scales on the cap, is not hygrophanous and may or may not have a smell (according to French authors of 'locomotive

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smoke'). The stem is clavate-bulbous whereas in *limonius* it is equal or slightly attenuated downwards or at the base, or sometimes slightly thickened in the lower part. I have not seen *callisteus* myself, but the clearest of these distinctions other than habitat seems to be the fertile gill edge without conspicuous sterile cells, cap with darker scales, and ± clavate-bulbous stem. These two taxa are clearly not synonymous.

Another species with which *limonius* can and probably has been confused is *speciosissimus,* which can look superficially somewhat similar, but has clearly larger spores and deeper coloured gills from the start. Finally there may have been confusion with *gentilis,* which is also abundant under Caledonian pine in Scotland and does occur farther south, but is smaller in stature, markedly and clearly striate when moist, more strongly hygrophanous and has the gill edge fertile.

Moser has included *callisteus* and *limonius* and a number of other ± brightly coloured taxa, which are in the British list under subgenus *Cortinarius* as well as a few from subgenus *Telamonia,* in his subgenus *Leprocybe* based on chemical affinity. He restricts subgenus *Cortinarius* to *C. violaceus* (Linn.: Fr.) Fr. and a non-British taxon, *C. hercynicus* (Pers.) Moser. Certainly *violaceus* is rather different from the others but Moser's subgenus *Leprocybe* is nearly as much of a mixture as subgenus *Cortinarius* in the New Check List (1960). If I used the taxon *Leprocybe* at all it would be as a section of subgenus *Cortinarius* after the removal of *limonius, gentilis,* and *saniosus* and its allies to at least two different sections in subgenus *Telamonia.* I prefer to keep strictly to the separation of all dry hygrophanous taxa into subgenus *Telamonia,* which then becomes clear cut.

I hope these comments will help to clarify the identification of these taxa. The following is a description of *limonius* from Scottish material.

Cortinarius (Telamonia) limonius (Fr.: Fr.) Fr., Epicrisis: 296, 1838.
Syn.: *Agaricus limonius* Fr.: Fr., Syst. Myc. I:213, 1821.
Icon.: Fries, *Icon. Sel.* 159[1] (very good!); Phillips, *Mushrooms and Fungi of Great Britain and Europe,* p. 135, top right.
Descr.: Kühner in Bull. Soc. Linn. Lyon 29:219, 1960.

Cap 30–104mm, convex then expanded, sometimes broadly obtusely umbonate or depressed at or around centre or with wavy-lobed margin when old, *apricot or rusty, sometimes rusty-tawny in centre, often with sienna or luteous tinge near margin, drying wholly apricot or orange luteous or more often with slightly darker sienna orange centre and saffron outer part,* sometimes radially darker streaky when drying out, *at first entirely with ± adpressed yellowish cream or pale luteous silky-fibrillose veil scales and appendiculate veil scales at margin,* later sometimes minutely adpressed silky-fibrillose scaly especially at centre (best seen when dry), sometimes smooth but with more persistent veil traces at the margin which may split radially or become puckered with age. *Gills* adnate or adnate slightly emarginate with tooth, *yellowish-cream* (*F*), *saffron or ochre* (*G*) then ± sienna or sienna cinnamon to rusty-tawny, fairly crowded, L 40–60 l (1–)3(–7), often veined and thick at base or rugulose or interveined, edge concolorous or slightly paler often uneven or eroded. *Stem* 50–155 × 7–22mm, *robust,* equal or sometimes slightly attenuated downwards or at

base especially when deeply buried in the substrate, less commonly slightly thickened in places, *yellowish-cream (F) or ochre (G) then orange or apricot in places finally sienna or sienna fulvous to ± rusty-tawny especially in lower part,* apex usually remaining pale (± the colour of the young gills), yellowish silky-striate and sometimes striate from gills, remainder ± strongly fibrillose striate or sometimes ± ribbed, *yellowish-cream or pale luteous veil forming at first ± apical floccose-scaly zone which soon discolours rusty-tawny from spores* and may disappear with age, hard and firm at first then more fragile, hollow, base white or whitish to pale saffron tomentose. *Flesh* in cap concolorous, drying straw or yellowish-cream (F), in stem straw or yellowish-cream in upper cortex, sienna or sometimes with slight luteous tinge in centre, lower part dark-brick or rusty-tawny. *Smell* none.

Spores 7–9 × 5·5–6·5(–7)μm, subglobose or broadly ellipsoid, punctate to fairly rough. *Basidia* 4-spored, 28–34 × 8–10μm. *Gill edge fertile at first but soon sterile* with numerous pyriform, clavate or more rarely ± cylindric cells, 20–50(–60) × (5–)8–20μm, *which often develop shorter or longer ± cylindric apical appendages* 2–50(–60) × 2–4(–5)μm which may rarely be slightly clavate (up to 6μm broad) or bifurcate at the tips. *Hyphae on cap* 2–8μm broad, encrusted-pigmented, over shorter broader hyaline or pigmented cells up to 22μm broad.

In Caledonian pinewoods in heather or moss often rather early in the season. Inverness-shire, Glen Affric, 15 ix 1956, *Orton* 989 and 27 viii 1963, *Orton* 2531; Perthshire, Rannoch, Dall, 3 x 1967, *Orton* 3169; Camghouran, 22 ix 1968, *Orton* 3484 and 29 ix 1968, *Orton* 3486; Black Wood, 28 ix 1968, *Orton* 3485; Inverness-shire, Abernethy Forest, 2 ix 1985, no material kept; Ebudes, Mull, Ardura, 6 ix 1968, *Orton* 3483 (this collection was under oak with no pine in the vicinity at all and was presumably a relict from former pinewood days).

C. limonius is recognized by the robust habit and habitat under pines, pale yellowish-cream (F) or pale luteous veil forming adpressed scales on the cap, appendiculate scales at the cap margin and a floccose ring-zone on the stem, sterile cells on the gill edge, bright colours and subglobose or broadly ellipsoid moderately sized spores. *C. callisteus* differs in habitat with spruce, darker scales on the cap, fertile gill edge with no sterile cells, slight veil and stem often ± distinctly clavate-bulbous.

C. limonius has been illustrated in various works without mention of details of the gill edge and this makes them sometimes unconvincingly authentic. Fries's illustration (loc. cit.) is, however, very good and shows specimens exactly as I have seen them in Caledonian forests in Scotland.

HEBELOMA

In 1985, with the help of the warden Mr R. S. Taylor, I made a collection of a *Hebeloma* at the RSPB reserve at Loch Garten, Abernethy Forest. The narrow spores and absence of veil enabled me to determine it as *H. cylindrosporum* Romagnesi. I believe this has already been collected elsewhere in Britain but I have no details. The following description may therefore be of interest.

Hebeloma cylindrosporum Romagnesi in Bulletin de la Société Mycologique de France 81:330 (Latin description), 328 (French description).
Icon.: none. Figs: Romagnesi, loc. cit. 329, fig. 3.

Cap 20–45(–70)mm, convex or conico-convex becoming expanded ± plane, often slightly obtusely umbonate, *cinnamon with brick or rusty-tawny centre and paler cinnamon buff margin,* sometimes saffron buff with sienna or rusty centre, strongly viscid when wet, thick-fleshed, sometimes with ± concentric small sienna or brick spots around the centre or towards the margin, thick-fleshed, margin sometimes whitish crenate when young or exceeding the gills slightly and becoming finely reflexed, sometimes costate or slightly tuberculate-striate. *Gills* narrowly adnate to ± free, pale, clay-pink, vinaceous-buff then pale to deep cinnamon, sometimes ± rusty-tawny when old, crowded, L (32–)44–64 l (1–)3–7, edge slightly paler or ± concolorous. *Stem* 32–45(–60) × 3–5(–9)mm, equal or slightly thickened at base or apex, white or whitish soon ivory or pale cream (B to D), sometimes ± buff in lower part when old, *entirely and rather finely white floccose-scaly almost to base when fresh* and sometimes more densely so at apex, stuffed becoming hollow at least at apex, rather firm at first. *Flesh in cap thick,* whitish or pale greyish cream (D) with vinaceous-buff, buff, pale fulvous or pale hazel horny layer over gills and sometimes also in stem apex, in stem cortex vinaceous-buff or clay-buff horny with pale cream narrow line on the outside, sometimes milky-coffee to ± hazel in lower cortex or slightly white pithy in stem-apex. *Smell none. Spore-print rather deep fulvous-cinnamon to ± fawn* (especially when wet).

Spores 8–10 × 4–4·5μm, narrowly cylindric-ellipsoid, sometimes with ruptured surface below the apiculus or towards the distal end, finely punctate-rough. *Basidia* 4-spored, rather small, 20–26 × 5–6μm. *Marginal cystidia* deep-seated, *rather small,* 20–32 × (2–)3–6μm at apex, usually slightly thickened downwards, sometimes ± cylindric flexuose with obtuse apex.

In sandy soil under *Pinus sylvestris*. Inverness-shire, Abernethy Forest, Garten Wood, 2 ix 1985, legit R. S. Taylor, *Orton* 5679 and 5 ix 1985, *Orton* 5680.

H. cylindrosporum is rather distinct because of the cylindric-ellipsoid rather narrow spores sometimes with ruptured surface, small marginal cystidia, small basidia, rather deep coloured spore-print, absence of smell, and stem white floccose-scaly when fresh. Romagnesi describes this taxon from a similar habitat ('pinèdes siliceuses'), so it may occur elsewhere in Britain in sandy coniferous woods. My specimens are a little thicker fleshed than those drawn by Romagnesi but otherwise agree quite well with his diagnosis.

A collection from Rannoch (Dall Reservoir Wood, 15 x 1977, on gravelly soil under pine) of a single rather old fruit-body is probably the same judging by the spores, but the marginal cystidia were a little larger (30–40 × (5–)6–10μm at apex) and sometimes more distinctly clavate, and the cap was entirely buff probably because it was old and dry. As the collection was rather old and I could find no others, I am not making a definite record of it.

HYGROCYBE

In 1985 in Argyllshire, amongst vegetation in soil in a cleft of a boulder in a field, one specimen of a small grey camarophylloid *Hygrocybe* was collected that I hoped might have been *H. cinerea* which I have never seen. Unfortunately, careful searching revealed no more specimens. However, when I examined it, I found that the spores were subglobose and too small for *cinerea* and, indeed, for any other taxon of this colour in available European literature. I therefore tried Smith & Hesler (*North American Species of Hygrophorus,* 1963), and found in it a subsection of section *Camarophyllopsis* created for taxa with this kind of small spores. I identified my collection with reasonable certainty as *Hygrophorus canescens* Smith & Hesler, distinguished by having an opaque silkiness on the cap and 'bluish-grey' colours in cap, gills and stem. This agreed with my specimen except that only the cap and gills showed such colours, the stem being paler. Smith & Hesler gave the habitat of their taxon as 'in grass under hemlock'. It is, however, well known that in N America common grassland species of *Hygrophorus* grow in woods, so I think this difference is not critical. I feel the collection can be recorded under this name, and I propose the necessary new combination in *Hygrocybe*. The following is a description of the Scottish collection.

Hygrocybe canescens (Smith & Hesler) P. D. Orton, **comb. nov.**
Basionym: *Hygrophorus canescens* Smith & Hesler in Lloydia 5:10, 1942.
Icon. and figs none.
Descr.: Smith & Hesler, *North American Species of Hygrophorus,* 88, 1963.

Cap 22mm, expanded ± plane with incurved margin, *mouse-grey or tinged vinaceous-grey with whitish grey margin,* dry, *opaque, finely silky hoary sub lente* in pale areas or at cap margin. *Gills* ± decurrent, *smoke-grey* or with very slight vinaceous-grey tinge especially near cap margin, fairly crowded, L 40 1 1(–3), *rather thick,* somewhat forked near cap margin, edge concolorous or slightly paler, ± even. *Stem* 35 × 10mm, compressed, narrowed downwards (4mm broad at base), *whitish or very pale grey, base ivory or very pale cream* (*D*), adpressedly finely white silky (as at cap margin) in upper part in places, matt smooth in lower part, firm at first but becoming hollow. *Flesh* in cap mouse-grey or tinged vinaceous-grey, in stem pale vinaceous-buff. *Smell* none or faint, slightly acid.

Spores 4·5–6 × 4–4·5μm, subglobose or broadly ellipsoid. Basidia 4-spored, c.40–50 × 5–6μm, sterigmata 4–7μm long. *Gill edge* fertile. *Hyphae on cap* 2–5(–6)μm broad, clamped, interwoven.

Amongst vegetation in soil in cleft of a boulder in the open. Argyll, Connel, Clais Dhearg, 18 ix 1985, legit G. Dickson, *Orton* 5682.

Hygrocybe canescens is recognized by the small subglobose spores, vinaceous-grey tinge to cap and gills, and hoary silky cap. Measurements given by Smith & Hesler are as follows: cap 20–45mm, stem 40–60 × 6–8mm, spores 4–5μm. No doubt the above description will need modification when further material has been examined.

MYCENA

Mycena purpureofusca (Peck) Saccardo, Sylloge Fungorum 5:225, 1887.
Syn.: *Agaricus purpureofuscus* Peck, NY State Museum Annual Report 38:85, 1885.
Misident: *Mycena atromarginata* (Lasch) Kummer sensu Dennis, Orton & Hora, New Check List of British Agarics, Trans. Brit. mycol. Soc. 43 Suppl.:115, 1960 non sensu Lasch, A. H. Smith, Kühner.
Icon.: none. Figs: A. H. Smith, North American Species of Mycena, 207, Plate 31, fig. 22^{1-2}, 1947.

Cap 6–25mm, conical or conico-convex, sometimes slightly umbonate, *umber or pale brown-vinaceous at centre,* paler milky-coffee or vinaceous-buff towards the margin, *when fresh with vinaceous-grey tinge at centre, drying with vinaceous or livid-vinaceous tinge at or around centre,* pellucid striate when moist, when dry matt with slight silky sheen or finely radially virgate around centre, margin often dark-edged like gills and sometimes slightly crenate. *Gills* uncinate or narrowly adnate with tooth, linear or barely ventricose, whitish to pale mouse-grey, sometimes tinged colour of cap near the cap flesh, not crowded, L (12–)16–24 l 1–3, edge *conspicuously vinaceous-grey or ± brown vinaceous to ± violaceous-black. Stem* 50–100 × 0·5–2mm, equal or slightly thickened in lower part, *colour of cap or milky-coffee often with slight vinaceous-grey tinge* but paler at base and apex, smooth, polished, hollow, fairly tense but fragile, base slightly white tomentose. *Flesh* in cap very thin, concolorous, drying whitish or pale greyish, in stem ± greyish. *Smell* none.

Spores 8–10(–11) × 6–7μm, broadly ellipsoid or slightly cylindric-ellipsoid. *Basidia* 4-spored. *Marginal cystidia* mostly fusiform or lageniform, a few ± clavate with or without sometimes forked or 3-branched apical appendage 3–5μm broad, 24–64 × 8–12μm, apex 5–10μm broad when lageniform, with milky-coffee or ± vinaceous-grey vacuolar contents.

On or about coniferous debris. Scattered but sometimes not uncommon in Caledonian pinewoods in N Scotland. It may well occur in other kinds of coniferous woods in Scotland. Inverness-shire, Rothiemurchus Reserve, 10 ix 1957, *Orton* 1284 and 23 viii 1960, *Orton* 2302; Perthshire, Rannoch, Black Wood, 21 x 1966, *Orton* 2901 and 22 x 1966, *Orton* 2902; Inverness-shire, Abernethy Forest, 28 viii 1985, no material kept.

M. purpureofusca is recognized by its habitat in coniferous woods, vinaceous-grey or livid-vinaceous cap, vinaceous-grey or ± brown-vinaceous to ± violaceous-black gill edge and rather slender usually solitary habit. *M. atromarginata* is larger (cap 15–32mm broad), subcaespitose and lacks purplish tinges and has the gill edge 'fuliginous-black'. *M. rubromarginata* also occurs in Caledonian pinewoods but has the cap and gill edge more clearly reddish.

M. purpureofusca was included in the New Check List (1960) as *M. atromarginata* but it is not the same as *Agaricus atromarginatus* Lasch which has been redescribed by Kühner (*Le Genre Mycena*, Encyc. Myc. 10:424, 1938) with characters agreeing with Lasch's diagnosis. I know of no firm evidence that this is British and, pending collection of material

from Britain agreeing with Kühner's description, I think it better to remove *M. atromarginatus* from the British list and substitute *M. purpureofusca.*

PHOLIOTA

I have for some time been familiar with a species of *Pholiota* related to *P. alnicola* (Fr.) Singer growing on wood of Caledonian pine in the Scottish Highlands but differing from *alnicola* in lack of smell and having the cap less viscid and soon turning brownish (sienna or cinnamon). I have searched in European literature in vain for such a taxon and could not find anything in Smith & Hesler's *North American Species of Pholiota* (1963) which agreed with my taxon. Fries described a few taxa in *Agaricus* subgenus *Flammula* growing on coniferous wood but none of these were convincing either. I did at one time think I might have collected *Agaricus inopus* Fr.: Fr., but in the validating description (Fries, *Syst. Myc.* I:251, 1821) this was said to grow on both beech and coniferous wood. Furthermore, the Bolton plate which Fries quoted for it (*History of Fungusses Growing about Halifax* Pl. 148, *A. radicatoramosus*) looks so much more like *Hypholoma radicosum* J. Lange that I could well understand older authors using the epithet *inopus* for *H. radicosum,* and in doing this they may well have been correct. It was only in later works that Fries restricted the habitat of *A. inopus* to coniferous wood and in any case there was never any mention of veil in these descriptions.

Another name I considered was *A. austerus* Fr. (*Epicrisis*: 188, 1838), but features underlined for this by Fries were cap 'hygrophano' and gills 'cinnamomeae (semper)' and the smell was given as 'amarissimus'. A white veil is mentioned in the descriptions but the other characters given do not agree with my Caledonian pine taxon.

When I began writing this paper I thought I would have to describe this taxon as a new species and was about to do so when Dr D. A. Reid very kindly drew my attention to a recent paper by Jacobsson (*Windahlia* 16:129–143, 1986) on the *alnicola* group which included a new species, *P. pinicola* Jacobsson, growing on *Pinus sylvestris* in Norway. This I could straightaway equate with my Scottish collections and a description of these under that name is given below.

I have also been aware for a long time of problems over the use of the epithets *alnicola, apicrea* and *salicicola.* I have many descriptions of *alnicola* from different parts of the country, including the Scottish Highlands, on wood of several different kinds of deciduous trees, although I have never seen it on pine or other conifers. I have little doubt that *apicrea,* at least as described in more recent years, is a synonym of *alnicola* and should be removed from the British list, for these and earlier descriptions do not mention any really distinct characters. As depicted by J. Lange (*Flora Agaricina Danica* L 122 E) I am sure it merely represents large, old specimens of *alnicola* such as occur on beech, in particular, but also on birch and no doubt other kinds of wood.

The original diagnosis of *salicicola* as a variety of *alnicola* (Fries, *Epicrisis*: 187, 1838) gives no really clear differences from *alnicola* except by inference from the name that it grew on *Salix*. In his next systematic

work (*Monographia Hymenomycetes Sueciae*: 356, 1857) this habitat is clearly stated. Its use at specific level is therefore rather arbitrary. Bon (*Bull. Soc. Bot. du Nord de la France* 24:43–60, 1971) has used the epithet *salicicola* for a taxon without smell or with smell 'herbacée', cap becoming ± tawny ('fauvâtre') and habitat on *Salix*. Jacobsson has used it for a taxon with an unpleasant smell, a bitter taste, cap 'sulphur yellow with brownish disc' also growing on *Salix*. It is therefore difficult to decide which is the better interpretation of these two. However, Fries himself quoted *Agaricus amarus* Bull. as a synonym of var. *salicicola,* so the bitter taste is perhaps more authentic. I know of no evidence that var. *salicicola* is British at the moment and do not propose to discuss the question of the correct name for it in this paper. I am not entirely convinced myself that taste can be used in this way in this group of taxa. I suspect that *alnicola* can on occasion taste bitter and I am not sure that there is a taxon in this group truly confined to *Salix*. More field work is needed with especial reference to collections growing on *Salix*.

P. aromatica P. D. Orton is another member of this group, but is distinct in having longer spores and small scattered rusty fibrillose scales on the cap and stem. It is some time since I collected *P. aromatica* and the exact habitat needs confirmation; the type collection was caespitose by a roadside near oaks but with deciduous stumps in the vicinity.

The following short key may help in showing the differences between these taxa (all members of this group have the cap ± viscid, well-marked veil, spores ± ellipsoid-amygdaliform in some views, rather variable marginal cystidia and are without chrysocystidia):

1. Smell unpleasant; on *Salix*; taste bitter (cap 'sulphur-yellow with brownish disk' sec Jacobsson) . . *salicicola* sensu Jacobsson
× Smell none or pleasant, aromatic; on various kinds of deciduous and coniferous wood; taste mild or slightly astringent 2
2. Smell none or faint, acidulous; on wood of *Pinus sylvestris* (cap soon fulvous, sienna or sienna-cinnamon at least in central part) . *pinicola*
× Smell faint to strong, aromatic; on deciduous wood . . . 3
3. Spores 9–11 × 4·5–5·5μm; cap lemon-yellow or straw, soon sienna or rusty at least in central part and with distinct ± concentric small rusty fibrillose scales, which are also present on the stem . *aromatica*
× Spores 7·5–10 × 4–5μm; cap predominantly lemon-chrome, lemon-yellow or straw, sometimes becoming greenish with age or ± sienna or cinnamon in the centre when large and old, without rusty fibrillose scales but sometimes marked with rusty spots; stem without rusty scales . . . . . *alnicola*

Pholiota pinicola Jacobsson in Windahlia 16:133, 1986.
Icon.: none. Figs.: Jacobsson, loc. cit., 134, figs 1–34,[a, b], 1986.

Cap 22–78mm, convex then expanded-convex or ± plane, sometimes obtusely umbonate, larger or older specimens often with wavy-lobed margin, *at first ± unicolorous sienna, then fulvous, sienna or sienna cinnamon with margin straw, yellowish-cream* (*F*), *ochre* (*G*) *or saffron,* more rarely with sulphur-yellow, greenish-yellow or lemon-chrome tinge, centre sometimes ± orange, apricot or rusty, expallent, when really dry

saffron, sienna or orange with yellowish-cream (F) or ochre (G) outer part, often with fulvous or fulvous olivaceous-buff marginal zone when half-dry, sometimes with small rusty or rusty-tawny spots at or around centre, slightly viscid when moist, *outer part at first with adpressed sometimes large whitish or cream* (*D*) *silky-fibrillose scales from veil* then ± smooth except near edge, *margin with white or whitish then cream* (*D*) *often rather thick appendiculate veil-scales at first,* margin incurved for some time, often slightly exceeding gills, pellicle separable. *Gills* adnate ± emarginate with tooth, sometimes becoming subdecurrent when old, pale cream (C) then cream (D), pale buff or buff, becoming deeper buff or fulvous buff to deep fulvous or fulvous cinnamon when old, rather crowded, L 32–56 l 3–7, edge paler and slightly denticulate when young then ± concolorous and even. *Stem* 40–170 × 3–15mm (5–17mm at base) ± equal but often with slightly attenuated, thickened or compressed base (especially when densely caespitose), pale cream (C), deep cream (E) or straw, *soon cinnamon, rusty-tawny or ± umber from base up,* apex persistently paler (E or straw), finely silky-striate, apex often also striate from gills and very finely pruinose when fresh, *white or whitish then cream* (*D*) *veil forming apical fibrillose ring and scattered adpressed patches below this* which become rusty-tawny from spores and are sometimes fugacious, lower part often fibrillose-striate or finely ribbed or rugulose, stuffed then ± hollow at least at apex, firm at first, fibrillose-tough at sometimes rooting usually caespitose base, which is whitish or pale saffron tomentose at first. *Flesh* in cap concolorous, drying pale cream (C) or pale straw, in stem cortex in upper part pale cream (C) or pale straw, shading to cinnamon, rusty-tawny or ± umber in stem-base, sometimes tinged lemon-yellow, lemon-chrome, orange or apricot in places, more especially in lower stem. *Smell none* or faint, acidulous when gathered. *Taste* mild then often slowly ± astringent when chewed.

Spores 7–9(–10) × 4–5μm, ellipsoid ± amygdaliform in side view, ellipsoid or ellipsoid-ovoid in face view, with small germ-pore. *Basidia* 4-spored, 26–34 × 6–7μm. *Marginal cystidia* cylindric-clavate or clavate or more rarely ± lageniform, often tightly packed, 20–38 × 4–8μm, apex 4–8(–10)μm broad. *Hyphae on cap* gelatinized, 1–4μm broad, over cylindric, clamped, branched, encrusted-pigmented cells 2–6(–8)μm broad. *Cystidia at stem-apex* cylindric to cylindric-clavate 25–40 × 5–8(–12)μm.

On or about Caledonian pine stumps or trees, often caespitose, sometimes densely so but also occasionally singly or in twos or threes. Perthshire, Rannoch, Black Wood, 25 x 1963, *Orton* 2538 and 21 x 1978, *Orton* 4980; Dall, 12 x 1965, *Orton* 2838 and 10 x 1980, *Orton* 5106; Inverness-shire, Abernethy Forest, Garten Wood, 22 ix 1985, *Orton* 5706.

P. pinicola is recognized by its habitat on pine, rather bright coloured, soon ± sienna or cinnamon capped fruit-bodies with darker rusty tawny or umber stem-bases, often densely caespitose habit, ellipsoid-amygdaliform spores 7–9μm long, and rather small nondescript marginal cystidia. *P. alnicola* may be similarly caespitose but is yellower and has a powerful aromatic smell and grows on deciduous wood. Jacobsson reports the latter on pine, but I have never found it so. *P. aromatica* is rather similarly coloured but has spores 9–11μm long and brownish scales on the

cap and stem and seemingly grows on deciduous wood. *P. salicicola* sensu Jacobsson is also yellower but has an unpleasant smell, is bitter and grows on *Salix*.

TRICHOLOMA

Amongst my notes on taxa belonging in *Tricholoma* are three that need description and discussion. The first is related to *T. sejunctum* (Sow.: Fr.) Quél., the second to *T. sciodes* (Pers.) Martin and the third is *T. viridilutescens* Moser.

I have known for some time that amongst collections assigned to *T. sejunctum* were two separate taxa. There is in Britain a southern one with which most descriptions of *T. sejunctum* agree, and there is a northern one, not uncommon in Caledonian pinewoods in the Scottish Highlands, which differs in having the gill edge sterile with ± conspicuous marginal cystidia often containing yellow vacuoles, smaller spores 4–6 × 3·5–4·5μm and more robust habit, and which has been described as *T. sejunctum* by Gro Gulden from Norway (*Musseronflora Slekten Tricholoma*: 78, 1969).

The validating description of *Agaricus sejunctus* Sow.: Fr. (*Syst. Myc.* I:47, 1821) gives the habitat as in coniferous woods, whilst in later descriptions Fries refers to it as growing in both deciduous and coniferous woods. There is no mention of a yellow gill edge in any of these descriptions. *T. sejunctum* has been described by Bon (*Les Tricholomes de France et d'Europe Occidentale*: 177, 1984) with spores 6–7·5(–8·5) × 5–5·5(–6)μm and a fertile gill edge, and by Bigelow from N America (*Sydowia*, Beiheft 8:57, 1979) with marginal cystidia 'absent or rare' and spores 6–7(–7·5) × 4–5·5μm and other characters similar to the southern *sejunctum* but growing under conifers. My spore measurements for the southern taxon (6–8 × 4·5–6(–6·5)μm) are very similar, and although I personally have collected this only in deciduous woods, most often on rather basic clay soils, it seems likely that it occurs in both kinds of wood. Further field work is needed to make sure that *sejunctum* from southern conifer woods really has the larger spore size and fertile gill edge. Bigelow (loc. cit.) gives *T. subsejunctum* Peck as a synonym of *T. sejunctum* and examination of type material of *subsejunctum* by courtesy of the Curator of the New York State Museum, Albany, New York, USA enables me to confirm this synonymy. The latter epithet is therefore not available for my northern taxon.

Before the northern taxon can be named two further epithets need consideration—*coryphaeum* and *arvernense*. *Agaricus coryphaeus* Fr. (*Epicrisis*: 26, 1838) was originally described with a yellow gill edge but from beech woods. In more recent times Bon (loc. cit.: 204) has described it from basic beech woods with spores (5·5–)6–7 × 4·5–5(–5·5)μm (i.e. the broad type) and with cap rather brightly coloured—'jaune doré' with brownish centre and sometimes with orange or reddish tints around the centre. This seems to me a correct interpretation of Fries's taxon but it clearly is not my northern taxon, neither is there any firm evidence that it is British as yet.

T. arvernense Bon (loc. cit.: 174) has similar spores to my northern taxon, given as (4·5–)5–6(–6·5) × 3·5–4μm, the gill edge sterile, and is

described from *Abies* and *Pinus* woods in the Central Alps in France, but there is no mention of a yellow gill edge, the taste is given as 'subfarineuse' and 'peu agréable à la fin' and the cap is brightly coloured—egg-yellow with orange or tawny tinged centre and the margin sometimes lemon-yellow, and is not virgate. In view of these brighter colours, lack of yellow gill edge and strong mealy smell and also the habitat in a warmer climate, I do not think this name can be used for my northern taxon either. It is noteworthy that Bon gives *T. sejunctum* sensu Gro Gulden as a synonym with a query, thus suggesting that he was not sure that it was the same.

Bon (loc. cit.) has described several varieties of *T. sejunctum* all with broader spore size, none of which agree with my northern taxon. The only description I have found which does agree is that by Gro Gulden (loc. cit.) as *T. sejunctum*. It seems to me quite likely that Fries knew this northern taxon and probably included it in his concept of *Agaricus* (*Tricholoma*) *sejunctus*, but this will never be known for certain and I prefer to interpret *sejunctum* according to long-standing tradition as the broader spored taxon. Because I have found no suitable name for it, the smaller spored northern taxon is described below as a new species.

There has obviously been some confusion in the use of the epithet *sejunctum* in the past. Spore-size differences observed from spore-prints have perhaps not been given the attention they deserve as taxonomic characters in *Tricholoma*. Although these differences are sometimes slight, they can be convincingly detected with practice and should, I think, be given more prominence in the genus, but it is necessary to make these measurements from spore-prints in order to achieve the best accuracy.

Tricholoma sejunctoides P. D. Orton, **sp. nov.**

Misident.: *T. sejunctum* (Sow.: Fr.) Quél. sensu Gro Gulden, Musseronflora Slekten Tricholoma: 78, 1969 non al.

Icon.: Gulden, loc. cit., Pl. 3c, *sejunctum*.

T. sejunctum proxime accredit sed *T. sejunctoides* a cystidiis aciei lamellarum, stipite robustiore, sporis paulum angustioribus et habitatione in silvis coniferis differt.

Pileus 60–140mm, pallide viridiflavus vel pallide luteus ad discum fuscus vel fere umbrinus, jove pluvio viscidulus, laevis vel subtiliter sericeo-fibrillosus sed saepe circa discum obscuriore innato-fibrillosus vel virgatus, cuticula admodum firma et praecipue ad marginem senectute vulgo rimosa. *Lamellae* anguste adnatae vel fere liberae, albidae vel pallidissime cremeae vel cremeo-griseae dein interdum olivaceo vel viridiflavo tinctae, confertae, L 66–100 l 1–3, ad aciem praecipue prope marginem pilei viridiflavae vel luteotinctae interdum partim concoloratae. *Stipes* 60–150 × 11–32mm (ad basim bis 36(–55)mm latus), leviter vel valide clavato-bulbosus, rariore fere aequalis, ex albo vel albido pallide cremeus vel leviter cinnamomeolineatus, rariore sursum leviter viridiflavo tinctus, sericeo-striatus, ad apicem primo albofloccosus, firmus dein intus molle fibrosus. *Caro* alba vel albida dein pallide cremea vel cremeogrisea. *Odor* fortis, farinaceus.

Sporae 4–6 × 3·5–4·5μm, subglobosae vel late ellipsoideae. *Cystidia aciei lamellarum* clavata cylindrico-clavata, fusiformia vel leviter lageniformia, 30–64 × 8–28μm, interdum viridiflavo vacuolata. *Hyphae cuticulae pilei* 2–8(–10)μm latae, hyalinae vel viridiflavo vel fusco vacuolatae.

Habitatio in pinetis. Typus: Perthshire, Rannoch, Black Wood, 1 x 1977, *Orton* 4945 (holo. E).

Cap 60–140mm, convex often slightly obtusely umbonate then expanded often with upturned wavy-lobed edge, *greenish-yellow, lemon-yellow, pale lemon-chrome or straw with clay-buff, milky-coffee or pale hazel centre then ± umber or date-brown in centre,* sometimes with a hazel zone near edge or becoming cream (D) or ochre (G or H) in outer part, from ± smooth or slightly scurfy to finely silky-fibrillose scaly especially in outer part, *often radially innately-fibrillose or ± date-brown virgate around centre,* slightly viscid when wet, margin incurved and finely tomentose at first, cuticle rather rigid and cracking easily especially at margin. *Gills* narrowly adnate-emarginate to ± free, whitish or ivory (B) then very pale vinaceous-buff especially near flesh of cap, sometimes becoming olivaceous-buff or tinged greenish-yellow or straw, crowded, L 66–100 l 1–3, *edge concolorous or becoming rather conspicuously greenish-yellow or lemon-chrome especially near cap margin. Stem* 60–150 × 11–32mm, up to 36(–55)mm broad at base, from slightly to markedly clavate-bulbous or more rarely ± equal with slightly thickened or narrowed base, often twisted or contorted, white or whitish becoming pale cream (D) or pale cinnamon or pale rusty streaky in places, less commonly with faint lemon-yellow or straw tinge in upper part, silky-striate, apex at first with scattered white silky flocci and sometimes striate from gills or horny streaky, hard and firm at first, cuticle rather tough, stuffed becoming spongy fibrous or ± hollow, extreme base finely whitish tomentose. *Flesh* white or whitish, horny over gills, sometimes marbled-horny in cap and upper stem centre, concolorous under cap cuticle, in stem-base becoming pale cream (D), pale vinaceous-buff or buff clay-buff or pale rusty. *Smell, strong, mealy. Taste* mealy or mealy-bitter.

Spores 4–6 × 3·5–4·5μm, subglobose or broadly ellipsoid. *Basidia* 4-spored, 30–36 × 6–7μm. *Gill edge sterile*; *marginal cystidia* cylindric-clavate, clavate, or fusiform to slightly lageniform, sometimes (more especially near edge of cap) with greenish-yellow vacuole, 30–64 × 8–28μm. *Hyphae on cap* 2–8(–10)μm broad, hyaline or with lemon-yellow or milky-coffee vacuolar pigment.

Under conifers. Not uncommon in Scottish Caledonian pine woods but not recorded by me in other coniferous woods. Inverness-shire, Loch-an-Eilean, 20 viii 1960 (no material kept), 30 viii 1980, *D. A. Reid & A. Thomas* (K) and Rothiemurchus Reserve, 14 ix 1984 (no material kept); Perthshire, Rannoch, Black Wood, 7 x 1964, *Orton* 2694 and 1 x 1977, *Orton* 4945 (holo. E); Inverness-shire, Abernethy Forest, Loch Mallachie, 5 ix 1985, *Orton* 5715 and Loch Garten, 4 ix 1980, *D. A. Reid & A. Thomas* (K).

T. sejunctoides is recognized by its robust habit, yellow colours in part, sterile gill edge with numerous marginal cystidia sometimes containing yellow vacuoles, small spores, and habitat with Caledonian pine. Gulden (loc. cit.) reports it from pine and fir woods in Norway. The difference between the taxa mentioned in the discussion about this species are given in the following key (all have the cap in part some shade of yellow). Non-British species are in parentheses.

1. Gill edge sterile with conspicuous marginal cystidia in some species containing yellow vacuole(s) 2
× Gill edge fertile (spores 6–8 × 4·5–6(–6·5)μm; cap straw or lemon-

chrome at least in part, usually dark grey, date-brown or blackish in centre and ± virgate around centre; in deciduous and also reportedly in coniferous woods) . . . . . .*sejunctum*

2. Spores (5·5–)6–7 × 4·5–5(5·5)μm (sec Bon, loc. cit., 205); in basic beech woods; (cap rather bright lemon-chrome or luteous and often also with orange or reddish tints, not virgate; smell not or less strongly mealy) . . . . . (*coryphaeum*)

× Spores within the range of 4–6(–6·5) × 3·5–4·5μm; in coniferous woods 3

3. Cap ± luteous ('jaune d'oeuf ou jaune indien' sec Bon) or orange in part, but margin sometimes lemon-chrome, not virgate; smell weakly mealy or ± unpleasant; gill edge without distinct yellow edge in any part; with *Abies* or *Pinus* in the French Central Alps; spores (4·5–)5–6(–6·5) × 3·5–4μm . . . . . (*arvernense*)

× Cap greenish-yellow, lemon-yellow, pale lemon-chrome or straw in part, often radially innately fibrillose or virgate around centre; smell strong, mealy; gill edge often greenish-yellow or lemon-chrome at least in part; with Caledonian pine in the Scottish Highlands, pine and fir in Norway sec Gulden; spores 4–6 × 3·5–4·5μm . *sejunctoides*

Tricholoma vinaceogriseum P. D. Orton, **sp. nov.**

T. sciodetem in mentem revocat sed a habitatione in pinetis, statura robusta, pileo vinaceogriseo adpresse tomentoso umbone pallidiore colorato, lamellis ad aciem saltem partim obscure coloratis et stipite non squamuloso maxime insignis.

Pileus 52–100mm, e conico-convexo expansus vulgo acute rariore obtuse umbonatus, vinaceogriseus ad marginem pallide argenteo vinaceogriseus vel albidus, umbone primo pallide cremeo vel griseo-cremeo adpresse tomentoso, circa umbonem minute floccoso-tomentosus vel leviter virgatus, ad marginem interdum concentrice adpresse squamulosus dein fere laevis. *Lamellae* adnatae vel fere liberae, pallide griseo luteolobrunneae, rariore primo griseo-incarnato tinctae, confertae, L 80–100 l (0–)1–3, admodum crassae, interdum furcatae vel venosae, ad aciem saltem partim vinaceogriseo vel senectute fuscobrunneo maculatae. *Stipes* 96–150 × 11–25mm (ad basim 13–30mm latus), aequalis ad basim incrassatus vel bulbosus, interdum flexuosus, ex albo albidus vel vinaceogriseo tinctus, ad basim pallide cremeus vel luteolobrunneus, rariore griseo-incarnato tinctus, tenue sericeo-fibrilloso-striatus, ad apicem primo albo sericeo-floccoso squamulosus, primo firmus, farctus vel leviter cavus, ad basim albo tomentosus. *Caro* pilei albida vel pallide grisea juxta lamellas colore cornus tincta, in corticem stipitis pallide griseo-cremea, in centrum stipitis alba, ad basim cremeo luteolobrunnea vel rariore griseo-incarnato tincta. *Odor* nullus. *Sapor* leviter adstringens.

Sporae 6–8 × 4·5–6μm, subglobosae vel late ellipsoideae. *Basidia* 4-sporigera 30–35 × 8–10μm. Acies lamellarum partim fertilis partim a cellulis cylindricis vel clavatis interdum brunneovacuolatis 20–40 × 8–14μm sterilis. *Hyphae* cuticulae pilei 2–6μm latae, hyalinae vel brunneo incrustato-pigmentatae.

Habitatio in pinetis. Typus: Perthshire, Rannoch, Black Wood, 20 ix 1975, *Orton* 4753 (holo. E).

Cap 52–100mm, conico-convex then expanded with often persistent small acute umbo, sometimes more obtusely umbonate and becoming ± plane with wavy-lobed margin, *pale to rather deep vinaceous-grey or sepia vinaceous-grey with paler silvery vinaceous-grey or whitish margin, umbo paler at least at first with whitish, pale greyish-cream, pale cream* (*D*) *or pale straw adpressed silky-floccose tomentum,* remainder with adpressed

silky-floccose tomentum at least in places which may break up into patches, sometimes slightly virgate streaky around centre, outer part sometimes ± concentrically adpressed scaly at first becoming ± smooth with age. *Gills* adnate to ± free, sometimes narrowly emarginate or with small tooth, *pale then deeper vinaceous-buff or clay-buff, occasionally with slight clay-pinkish tinge when fresh,* crowded, L 80–100 l (0–)1–3, rather thick, sometimes forked near stem or halfway to margin or veined and crisped or veined on sides or rugulose, edge ± markedly vinaceous-grey spotted at least in part and when fresh, sometimes snuff-brown when old, more rarely entirely concolorous. *Stem* 96–150 × 11–25mm (13–30mm broad at base), *robust,* ± equal or with thickened or sometimes rounded marginately bulbous base, sometimes slightly flexuose, *white then whitish or tinged slightly vinaceous-grey, bulb usually pale cream* (*C to D*) *or creamy-buff, more rarely slightly clay-pinkish, finely silky-fibrillose striate, apex and sometimes upper stem white silky-floccose punctate* or slightly *netted scaly when fresh* then adpressedly floccose to silky-striate, *fibrous but hard and firm at first,* stuffed or slightly hollow, base white tomentose. *Flesh* in cap whitish to pale clay-buff or pale drab, drab-horny over gills, white in stem centre, pale dirty cream in stem cortex, base more clearly cream (D) or creamy-buff, sometimes pale clay-pinkish in base or apex. *Smell* none. *Taste* slightly bitterish or slowly slightly astringent.

Spores 6–8 × 4·5–6μm, subglobose or broadly ellipsoid. *Basidia* 4-spored, 30–35 × 8–10μm. Gill edge partly fertile with numerous cylindric-clavate, clavate or slightly lageniform cells in places, 20–40 × 8–14μm, some with vacuolar or granular brownish pigment. *Hyphae on cap* filamentous, 2–6μm broad, hyaline or brown encrusted-pigmented, often strongly so or with pigment in strips.

In Caledonian pinewoods. Perthshire, Rannoch, 20 ix 1975, *Orton* 4753 (holo. E) and 15 x 1978, *Orton* 4990; Inverness-shire, Abernethy Forest (eastern side), 25 ix 1982, no material kept.

T. vinaceogriseum is recognized by its robust habit, cap usually with pale umbo and vinaceous-grey tints in outer part and at least in part adpressed tomentose and not markedly virgate, and habitat under Caledonian pine. It may be likened to a large smooth-stemmed *T. sciodes* with pale ± acute cap centre and seemed very distinct when first collected. The tomentum on the cap is best seen when the cap is dry. It favours heathery banks and the stem is often deeply immersed in heather or moss and pine humus.

It may have been recorded either as *T. sciodes* or *T. virgatum* in the past and, as there has been to my mind some confusion over these names in the past, I add some comments on these taxa and a short key to show the differences between them and *T. vinaceogriseum* as I understand them, and also to *T. bresadolianum* Clemençon (see below). I find *sciodes* to be much more common in England than true *virgatum* (as I conceive it) which I have looked for in vain in England in recent years. Also, I have seen *sciodes* named as *virgatum* on more than one occasion.

T. sciodes (Pers.) Martin has recently been redescribed and a topotype designated from Secretan's collecting grounds by Clemençon (*Nova Hedwigia* 28:28, 1977) although Secretan's name cannot now be quoted

for it. This description agrees with the concept of the taxon in the New Check List (1960). It occurs not uncommonly in England and Scotland under beech and I have seen it under oak and birch, but have no notes from such a habitat which therefore needs confirmation. I have not found it in northern pinewoods. *T. sciodes* differs from *T. vinaceogriseum* in the presence of blackish fibrils or small very scattered scales on at least part of the stem and in the nearly always obtuse cap with a dark centre. On the other hand the cap has similar vinaceous-grey tints, and a tendency for occasional clay-pinkish tints to be found in the gills and stem flesh is common to both. The cap may be virgate to some extent which, no doubt, has led to it having been determined as *T. virgatum* in the past.

T. virgatum (Fr.: Fr.) Kummer on the other hand has a very clearly virgate cap without any signs of adpressed tomentum and is smooth-stemmed. It has the cap consistently grey often with darker centre, and is normally markedly conical. It is well illustrated by Bresadola (*Icon. Mycol.* 89). Konrad & Maublanc (*Icones Selectae Fungorum* 258) and J. Lange (*Flora Agaricina Danica* L 23 D). It seems to be less robust than *T. vinaceogriseum* and is not confined to pinewoods, being found also under birch and probably also oak and possibly beech. More exact observations are needed on fresh material to establish the exact habitat in Britain.

Clemençon has recently added another species to this group: *T. bresadolianum* Clemençon (*Docums. mycol.* 27–28:54, 1977 = *T. bresadolae* Clemençon, *Nova Hedwigia* 28:32, 1977 non *T. bresadolae* Schulzer, *Hedwigia* 24:132, 1885) for the taxon illustrated as *T. muriniaceum* (Bull.: Fr.) Gillet by Bresadola (*Icon. Mycol.* 88), which differs in much more distinctly and coarsely squamulose cap and stem, cap grey ('asch-grau') and absence of vinaceous-grey or clay-pinkish tints in cap, gills or flesh. It is described as growing under oak and beech. Bon (loc. cit.: 113) has given a further description and points out that *T. murinaceum* sensu Cooke and Rea is identical. Certainly Cooke's plate (*Ill. Brit. Fung.* I: Pl. 82/49) looks authentic and the taxon may therefore be regarded as British. There is an unpublished plate by Rea in Herb. Kew as *T. murinaceum* from Mulgrave Woods, Scarborough, Yorks., which might possibly represent this taxon, although the stem is shown longitudinally fibrillose rather than scaly. I have not knowingly collected it myself, but I may very well have misidentified it as either *sciodes* or *virgatum* in the past. It is possible that if *sciodes* has been recorded under oak then this may have been *bresadolianum*. It would be better to have a good description of fresh material from Britain before regarding it as authentically British.

The following provisional key may help in distinguishing the four taxa in this group. All have marginal cystidia and the gill edge may be darker in places or entirely so or some gills in a fruit-body may have the edge concolorous. In all four the taste is ± nasty-bitterish and the spores are broadly ellipsoid or ellipsoid within the range of about 6–8 × 4–6μm. Spore measurements for my one recent collection of *virgatum* appear to be a little narrower than those I have measured for *sciodes,* but I wish to study more fresh material of *virgatum* before quoting spore width as a difference. It seems that the gill edge is darkened most extensively in *sciodes,* where it is blackish, and least extensively in *bresadolianum* where

it is brownish. Past records of *sciodes* and *virgatum* should be treated with suspicion unless descriptions or material are available for checking.

1. Cap in part vinaceous-grey then often especially around centre umber, purplish-date or with clay-pinkish tinge; gills white or whitish then greyish or clay-buff sometimes with clay-pink tinge 2
× Cap smoke-grey to mouse-grey without vinaceous-grey or clay-pinkish tints, in *virgatum* sometimes with faint leaden-grey tinge at first; gills white then grey without clay-pink tinge 3
2. In deciduous woods under beech (often on basic soils); stem with at least a few scattered blackish or brownish fibrils or small scales; cap obtusely umbonate or convex at first, grey or vinaceous-grey then purplish-date, umber or with clay-pinkish tinge, rarely slightly paler or tinged buff at centre, radially innately-fibrillose or virgate with minute adpressed or slightly reflexed ± concentric fibrillose scales at least around centre; smell musty-mouldy (of 'grünem Mais' sec Clemençon); gill edge usually markedly blackish; taste unpleasant, bitterish-nasty . . . . . *sciodes*
× Under conifers in the Scottish Highlands (Caledonian pine so far); stem white silky-striate or floccose without darker scales or fibrils; cap ± acutely umbonate with pale greyish cream, pale cream or pale straw umbo contrasting with vinaceous-grey or sepia vinaceous-grey surrounding area and pale margin, adpressedly and finely tomentose, sometimes slightly virgate around centre or with tomentum cracking into patches; smell none; taste slowly slightly astringent; gill edge concolorous or vinaceous-grey to snuff-brown . . . *vinaceogriseum*
3. Stem silky-striate, without distinct darker scales, white or becoming ivory or very faintly milky-coffee or clay-pinkish in middle part; cap smoke-grey occasionally with faint leaden-grey tinge when fresh, usually darker at centre, strongly radially fibrillose-virgate and sometimes with silky sheen in outer part; gill edge concolorous or blackish in part; under pine and birch (? other deciduous trees) *virgatum*
× Stem with ± concentric dark grey fibrillose scales at least in part, whitish or pale grey beneath; cap grey ('asch grau' sec Clemençon), sometimes buff or saffron at centre ('ockerlich'), with adpressed darker scales arranged radially and often also ± concentrically; gill edge concolorous or less markedly darkened (brownish); under beech and oak . . . . . *bresadolianum*

The following illustrations may be quoted:

sciodes	BSMF 99: Atlas Pl. 233, 1983 (very good)
virgatum	Bres 89; L 23 D (good); KM 258 (good)
bresadolianum	Bres 88, *murinaceum* (good); Cke82/49, *murinaceum*; KM 260, *virgatum* var. *sciodes*

Tricholoma viridilutescens Moser, Fungorum Rariorum Icones Coloratae 7:12, 1978.

Syn.: *T. fucatum* Fr. var. *lutescens* Moser, in Sydowia 4:104, 1950 (nom. nud., no type designated).

Misident.: *T. subsejunctum* Peck sensu Bon, in Docums. Mycol. 6:179, 1976 non sensu Peck.

Icon.: FRIC 7:14, figs 15–21 and Pl. 50c, 1978; Figs: Bon, Les Tricholomes de France et d'Europe Occidentale: 184, fig. 39, 1984.

Cap 42–82mm, convex, obtusely or acutely umbonate becoming expanded often with upturned wavy-lobed margin, *centre hazel, deep milky-coffee or ± date-brown, outer part clay-buff or vinaceous-buff, and usually olivaceous-buff, straw or pale lemon-chrome in places or entirely so, sometimes grey-olivaceous around centre,* matt or minutely adpressed scaly at centre, *radially sepia or grey-olivaceous innately fibrillose or virgate at least around centre,* often entirely so, sometimes in part reflexed minutely fibrillose-scaly, margin often splitting. *Gills* adnate emarginate, usually narrowly so, to ± uncinate-free, *whitish soon pale sulphur-yellow or pale lemon-yellow especially near the cap flesh,* often deeper lemon-yellow or pale lemon-chrome near edge of cap, crowded, L 60–100 l 1–3, rather thick, edge concolorous, even or uneven. *Stem* 72–135 × 8–17mm, equal or slightly attenuated at base, less commonly slightly thickened at base or apex or flexuose, *pale sulphur-yellow or pale olivaceous-buff, apex and base sometimes whitish,* finely silky-fibrillose, firm and hard at first, stuffed-fibrous, sometimes becoming hollow in places, base white or whitish strigose or tomentose. *Flesh* whitish in cap and stem centre, sometimes concolorous or olivaceous-buff under the cap cuticle, usually ± pale sulphur-yellow or olivaceous buff in stem-cortex. *Smell* faint to rather strong, mealy, especially when cut.

Spores 6–8(–9) × 4·5–6·5(–7)μm, subglobose or broadly ellipsoid. *Basidia* 4-spored, 34–40 × 7–8μm. *Gill edge fertile. Hyphae on cap* filamentous 3–10μm broad, hyaline or encrusted-pigmented.

In deciduous woods. Perthshire, Rannoch, Camghouran, under birch, 24 ix 1968, *Orton* 3433; Ebudes, Mull, Salen Wood, under oak and birch, 23 ix 1969, *Orton* 3800; Perthshire, Rannoch, Dall Wood, under birch, 16 ix 1973, *Orton* 4591.

T. viridilutescens is recognized by the ± sulphur-yellow gills and stem, cap milky-coffee or ± date-brown in centre with paler clay-buff or grey-olivaceous or more often olivaceous-buff or pale lemon-chrome outer part and rather strongly innately fibrillose or virgate at least at centre, fairly large ± subglobose spores and fertile gill edge. It differs from *T. sejunctum* and *T. sejunctoides* in greener or more olive colours and more strongly virgate cap. *T. portentosum* has the cap entirely without greenish or yellow colours and *T. fucatum,* although rather similarly coloured, has blackish fibrillose scales on cap and stem.

Although this description of Scottish material does not agree exactly with that of Moser, since he describes the smell as faint and never mealy and gives the basidia as 2-spored, I think this is a correct determination nevertheless, for I have found the smell variable from almost none to rather strong mealy and suspect that 2-spored basidia only occur sometimes. Bon (loc. cit.) describes the smell as weakly mealy and gives the basidia as '4(2) spored'. Further observations on fresh material are needed to clarify these points. This taxon has nothing to do with *T. subsejunctum* Peck which is a synonym of *T. sejunctum* (see under *sejunctoides*).

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