

Some notes on the genus *Cortinarius* in Britain

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Summary. — Five new species of *Cortinarius* are described: *C. (Myxacium) subdelibutus* P. D. ORTON, *C. (M.) zosteroides* P. D. ORTON, *C. (Telamonia) lanigeroides* P. D. ORTON, *C. (T.) cremeolaniger* P. D. ORTON, and *C. (T.) traganulus* P. D. ORTON. A redefinition and description from British material of *C. (Phlegmacium) decoloratus* (FR. ex FR.) FR. is given, together with a description of British material of *C. (Sericeocybe) diabolicus* FR.

Introduction

These notes are based on personal collections made since 1954 and are a start in the publishing of a large number of new taxa of this genus which I have found in Britain. Colour terms in the descriptions are as in the Colour Identification Chart to the Flora of British Fungi, HMSO, Edinburgh (1969).

In my experience a great many taxa in this genus are very much limited to one particular habitat (kind of soil, range of humidity and temperature etc.) and are often also associated with one particular tree or genus or family of trees. There are, for instance, many taxa found with *Betula* in Britain both in the Scottish Highlands and in England and Wales which do not seem to have been described in European literature, possibly because the type of birchwood habitat in Britain is different from continental habitats of that tree. This is also true for other trees; I have, for example, found a whole series of taxa obviously associated with *Quercus* on rather clayey soil in S England which do not seem to be in the continental literature either. On the other hand there are many continental taxa, especially those associated with *Abies* or *Picea*, which we do not seem to have in this country despite fairly extensive plantations of these trees, probably because neither of these genera of trees are native or the habitat is not exactly correct. It seems to me that eventually it should be possible to characterise a great many of the taxa, especially in *Telamonia*, by habitat, although there are the inevitable exceptions, which occur in several different habitats, to prove the rule and complicate matters. There are so many British species of *Telamonia* not yet in the literature that it is not yet possible to make accurate or near complete lists of species associated with one particular tree. I am hoping to be able at least partially to fill in this gap in our

knowledge before long. The descriptions in this paper are a very small contribution towards this task!

Subgenus *Myxacium*

I have for a long time felt that the treatment I gave of this subgenus in *Cortinarius* I (1955) is very inadequate as well as being erroneous in places, and does not include anything like the total number of taxa we have in Britain. I have not found the treatment of this subgenus in continental literature very helpful either. I must do further field work before producing a fresh key but I am taking this opportunity to describe two British taxa which I do not believe have been previously described.

There seems to be considerable confusion in the taxa centred round *C. collinitus* (Sow.) Fr., *C. pseudosalor* LANGE and *C. trivialis* LANGE. I am not happy about separating the taxa in these groups according to the presence or absence of clamp-connections when writing keys for identification. This character is splendid when clamps are present, but when they are apparently absent, much time can be lost looking for them, and in any case I am not totally convinced of its reliability. I think it should be perfectly possible to avoid this character for identification purposes.

Another cause of trouble is the presence or absence of a sterile gill-edge. From my experience I should say that the distinction is not between gill-edge fertile and gill-edge sterile, but between gill-edge fertile or sterile with basidiiform cells not more than 14 μm broad and gill-edge sterile with wellmarked broader often characteristically shaped cells 10–30 μm broad. It is misleading to state categorically that *C. trivialis* and *C. collinitus* have the gill-edge fertile. In my experience this seems correct for young specimens, but older ones nearly always seem to acquire a sterile gill-edge at least in part.

I am still making descriptions of these taxa and feel I have still much to learn about them. Although I think it possible to recognise *C. collinitus* and *C. trivialis* *sensu originali*, I have found other taxa which are not these and do not seem to have been described. I do not feel the creation of varieties or forms as some authors have done for this group is any use in the genus *Cortinarius* for it merely makes things more complicated. In my view a narrow species concept is the *only* way satisfactorily to cope with the enormous number of taxa in this genus. I am therefore taking this opportunity to describe as a new species one rather characteristic relatively pale taxon in this subgenus apparently associated with *Quercus*, with stem conspicuously banded by the veil and with conspicuous sterile cells on the gill-edge.

Another problem in this subgenus concerns the group of taxa centred round *C. delibutus* FR. and their identity or otherwise with *C. illibatus* FR. and *C. nitidus* (SCHAEFFER: FR.) FR. To agree with the Friesian validating descriptions the epithet *delibutus* should be used for a taxon with gills blue-violaceous at least when young, *illibatus* for one with gills 'ex incarnato argillaceis' and of rather smaller size than *delibutus*, and *nitidus* for one found in beech woods with gills crowded and decurrent and rather fugacious veil. In Scottish birch woods we have a taxon recognisable in the field with rounded spores similar to those of *delibutus* but with whitish, cream or pale ochraceous cap and stem, consistently without blue-violaceous colours and rather less robust than *delibutus*. I would not name this *illibatus* because the gills are never pinkish, neither would I name it *nitidus* because it is not a beech wood taxon, and does not have the correct gill characters nor the longer spores (10–11×6 µm) currently attributed to *nitidus* by European authors. There seems to have been a tendency to think that any pale coloured taxon belonging to this group must be *illibatus* or *nitidus* because these were the only two that FRIES described. This is not sound reasoning because FRIES himself said that he had not described all the species he had seen and in any case only dealt with species from such habitats as were available to him in Sweden. I have collected a taxon with clay-pinkish young gills, a rather yellower cap and of small size although with similar roundish spores, which I prefer to regard as *C. illibatus* FR. sensu FR. I am therefore describing the Scottish birchwood taxon as a new species, since I do not believe it has been described already. No doubt it will be found in England and perhaps elsewhere in continental Europe in due course.

1. *Cortinarius* (*Myxacium*) *zosteroides* P. D. ORTON, sp. nov.
– Fig. 1

*C. triviale*m et *C. fulvosquamosum* in mentem revocat, sed a coloribus stiptis albis vel cremeis et sporis latoribus differt. Pileus 35–84 mm, ochraceo-fulvus vel cinnamomeus, interdum ad centrum obscuriore brunneus vel ad marginem pallidiore luteolobrunneus vel cremeus, ad marginem versus rugoso-striatus. Lamellae e pallide luteolobrunneis ochraceofulvae vel fere cinnamomeae, subconfertae. L 32–50(70), 1–3(7). Stipes 80–150×8–12 mm, vulgo supra basim ventricosus (10–15 mm latus), albus dein praecipue ad apicem pallide cremeus, a velo glutinoso albo vel cremeo cingulatus. Sporae 12–15(16)×7–9(10) µm, ellipsoideae vel late amygdaliformes vel limoniformes interdum leviter papillatae, mediocriter vel valide verrucosae. Acies lamellarum steriles, cellulis clavatis, cylindrico-clavatis, leviter fusiformibus vel pyriformibus, 30–60×12–30 µm. Habitatio in quercetis. Hants., New Forest, Worm-stall Wood, 23 x 1982, ORTON 5342 (holotypus, E).

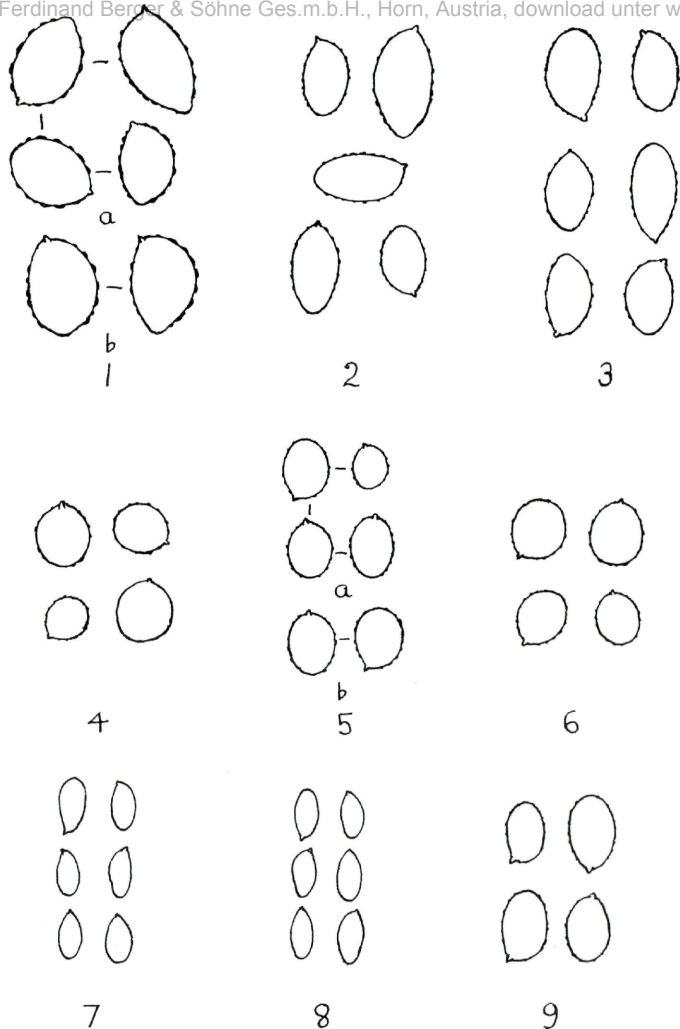
Cap 35–84 mm, conico-convex or convex then expanded-conical to broadly umbonate, often slightly depressed around centre, *saffron*, *sienna*, *fulvous* or *cinnamon* with outer part soon paler

creamy-buff or buff, sometimes when young date-brown or cigar-brown at centre or when mature \pm unicolorous yellowish-cream (E) or buff, smooth and glutinous at first, *soon strongly wrinkled-striate in outer part*. – Gills adnate with tooth, *pale then deeper buff to fulvous-buff or fulvous*, finally deep fulvous or \pm cinnamon, rather crowded, L 32–50(70), 1–3(7), sometimes veined on sides or crisped or forked-anastomosing, edge white or whitish flocculose-denticulate when fresh. – Stem 80–150 \times 8–12 mm, usually slightly ventricose above \pm attenuated base and there 10–15 mm broad, *white hardly changing but becoming ivory (B), cream (D) or pale buff, apex at first + silky-flocculose scaly, \pm smooth below white cortinal zone, white or whitish to pale cream glutinous veil forming \pm concentric but sometimes oblique or disrupted bands on white or whitish background*, the bands with edges often rather thick and reflexed or jagged and flocculose-striate above, stuffed often becoming \pm hollow, firm at first. – Flesh in cap cream (D) or pale buff, sometimes darker under the cuticle, in stem whitish, creamy-buff or buff often remaining whitish in stem-base. – Smell none.

Spores 12–15(16) \times 7.5–9(10) μm , in face-view \pm ellipsoid, in side-view broadly amygdaliform or limoniform sometimes with slight papilla, rough to very rough. – Basidia 4-spored. – Gill-edge with clavate, cylindric-clavate, slightly fusiform to pyriform, rarely lageniform cells, 30–60 \times 10–30 μm .

Seemingly with oak. Hants., New Forest, Rufus Stone, 18 xi 1969, ORTON 3809, (oak and beech); Norfolk, Burntfen Broad, 14 x 1973, ORTON 4593, (oak and birch); Norfolk, Brooke Wood, 25 x 1981, ORTON 5189, (oak); Hants., New Forest, East End Pond, 21 x 1982, ORTON 5341 and Wormstall Wood, 23 x 1982, ORTON 5342 (holo, E), (mainly oak).

The bands of pale veil on the stem on a pale background, fairly robust stature, broad spores and habitat probably with oak are diagnostic. It is one of a number of taxa with banded stems. *C. fulvosquamosus* P. D. ORTON (1976) is somewhat similar but is darker coloured (especially the stem), has narrower ellipsoid-amygdaliform spores, 11–14(15) \times 7(7.5) μm (fig. 2) and is seemingly attached to *Salix* spp. (sallow). *C. trivialis* LANGE besides having shorter narrower ellipsoid or ellipsoid-amygdaliform spores 10–14(15) \times (5.5)6–7(7.5) μm (fig. 3) is darker coloured, especially the stem, and has gills pale livid-vinaceous or vinaceous at first as well the gill-edge fertile or sterile with narrower basidiiform cells. *C. collinitus* (Sow.) FR. also has the gill-edge fertile or sterile with narrow basidiiform cells, but has the stem at least in part blue-violaceous and the cap rusty or rusty-tawny with sienna or orange margin and is associated with conifers. Finally there is *C. elatior* FR. with gills “always dark, brown-rusty”, which in the original



Spores. $\times 1000$: Fig 1: *Cortinarius zosteroides*: a, New Forest, Wormstall Wood, 23 x 1982; b, Norfolk, Brooke Wood, 25 x 1981. - Fig 2: *C. fulvosquamosus*: Somerset, Horner Water, 30 x 1978. - Fig 3: *C. trivialis*: Norfolk, Brooke Wood, 21 x 1981. - Fig 4: *C. subdelibutus*: Rannoch, Dall Reservoir Wood, 24 ix 1978. - Fig 5: *C. decoloratus*: a, Rothiemurchus, Loch-an-Eilean, 26 x 1969; b, Rannoch, Dall Farm Wood, 27 ix 1978. - Fig 6: *C. diabolicus*: Norfolk, Surlingham, Wheatfen Broad, Home Marsh Wall, 22 ix 1964. - Fig 7: *C. lanigeroides*: Esher, Black Pond, 15 x 1954. - Fig 8: *C. cremeolaniger*: Esher, Black Pond, 28 x 1982. - Fig 9: *C. traganulus*: Abernethy Forest, 8 ix 1971.

descriptions is said to have the stem banded by the veil and to be found in pine woods or with other trees but which is unknown to me on account of the dark gills, for I have never collected any specimens with this feature belonging to this group. I have, however made one collection of a pale taxon with banded stem with relatively small markedly limoniform spores which awaits further field work.

2. *Cortinarius* (*Myxacium*) *subdelibutus* P. D. ORTON, sp. nov. – Fig. 4.

A *C. delibuto* affinis sed toto sine tinctis caeruleis vel violaceis et a statura graciliore et probabilius habitatione in betuletis differt.

Pileus 19–66 mm, e cremeo luteolobrunneus dein ochraceo vel pallide cinnamomeo tinctus, glutinosus, siccitate sericeonitens, interdum ad marginem versus innato fibrillosus. Lamellae e pallide cremeis vel luteolobrunneis ochraceofulvae vel ochraceo-cinnamomeae, \pm confertae, L 40–72, 1–3(7). Stipes 32–100 \times 3–10 mm, vulgo ad basim incrassatus (7–20 mm latus), albidus vel pallide cremeus a velo cremeo vel ochraceo infra zonam cortinae decoratus. Sporae 7–9 \times 6–7.5 μ m, subglobosae, punctato verruculosae. Habitat in betuletis. – Perthshire, Rannoch, Dall Reservoir Wood, 24 \times 1978, ORTON 4992 (holotypus, E).

Cap 19–66 mm, convex then expanded, sometimes obtusely umbonate or slightly depressed around centre, margin often remaining incurved for some time, *cream (C, D) then creamy-buff to buff*, sometimes tinged saffron or pale cinnamon in part or yellowish-cream (E) at margin, *glutinous-viscid when fresh drying matt with silky sheen*, sometimes innately radially silky-fibrillose in outer part, margin with adpressed veil scales at first which disappear or show as a line just inside the margin. – Gills adnate with tooth or slightly emarginate, *pale cream (D) then deeper cream (E), creamy-buff or pale fulvous, finally saffron-buff, saffron-fulvous, fulvous or saffron-cinnamon*, rather crowded, L 40–72, 1–3(7), sometimes veined on sides or interveined in larger specimens, edge paler and often slightly uneven then \pm concolorous and even. – Stem 32–100 \times 3–10 mm, usually slightly, sometimes strongly, thickened at base (and there 7–20 mm broad), more rarely equal or slightly attenuated at base, often flexuose, whitish to pale cream (C), deeper cream (D) or creamy-buff when old, apex scattered white floccose, viscid veil whitish then cream (D) or sometimes ochraceous (E–F) or pale ochre, often most deeply coloured just below the cortinal zone, matt with silky sheen when dry, firm at first but soon soft and rather spongy in base, stuffed-solid. – Flesh in cap cream (D) to creamy-buff often darker beneath the cuticle, in stem whitish to cream (C–D), cream-horny in apex, sometimes \pm yellowish-cream in base. – *Smell* none or faint, fungussy.

Spores 7–9 \times 6–7.5 μ m, subglobose or very broadly ellipsoid, finely punctate to punctate-rough. – Basidia 4-spored. – Gill-edge fertile.

With birch. Perthshire, Rannoch, Dall Plantation, 13 ix 1975, ORTON 4754 and Dall Reservoir Wood, 24 ix 1978, ORTON 4992 (holo, E).

Differs from *C. delibutus* FR. in normally less robust stature and lack of blue-violaceous tints in gills or stem. *C. illibatus* FR. sensu FR. is rather smaller, has gills clay-pinkish at first as well as yellower cap and veil. *C. (Phleg.) decoloratus* (FR.) FR. is also betulicole and similarly coloured though always pale, but lacks viscid veil on the stem and has narrower spores (see description below and fig. 5). I do not think this taxon is any of the numerous varieties, forms or subspecies HENRY describes for *C. delibutus*. In my experience *C. delibutus* is not confined to one particular kind of tree, for, although I associate it more particularly with beech, I have also seen it under birch, and I have noted it as having a radishy smell at least when cut, which I have not so far detected for *C. subdelibutus*.

Subgenus *Telamonia*

In this paper I am describing as new species three taxa from a large number of apparently undescribed ones which I have found in Britain in the last thirty years. Two of them are related to *C. laniger* FR. but have small narrow fusiform-ellipsoid spores, one probably associated with birch and the other with conifers. Both of these were collected in one area, although in different places, and with an interval of thirty years between finding them. In fact I found the second one when revisiting the locality after a long period in order to rediscover the first one, without success so far! I do not think they are the same for the veil characters are different and probably also the habitat. The third one is associated with birch and is well characterised by its violaceous veil, strong fruity smell and spores, although I have only found it in the Rothiemurchus and Abernethy Forest arlas in Inverness-shire.

3. *Cortinarius* (*Telamonia*) *lanigeroides* P. D. ORTON, sp. nov. — Fig. 7

A. C. lanigero similis sed a sporis angustioribus et brevioribus et habitatione probabiliter in *Betuletis* differt. Pileus 45–120 mm, cinnamomeus vel lateritius, siccitate cinnamomeo luteolobrunneus interdum partim ochraceo tinctus, sub lente albo-sericeo fibrillosus, a velo albo vel albido primo appendiculato praecipue ad marginem versus adpresse squamulosus. Lamellae ex ochraceo-cinnamomeis ferrugineo-lateritiae vel ferrugineo-fulvae, subconfertae, L 56–100, 3(7). Stipes 60–100×10–20 mm, ad basim incrassatus vel saepe forte clavato-bulbosus et 17–40 mm latus, rariore fere aequalis, ex albo luteolobrunneus vel pallide cinnamomeus, ad apicem fibrillostriatus, a velo albo vel albido forte floccoso annulatus et maculatus, senectute ad basim spongiosus. Sporae 6.5–8×3–4 µm, fusiforme-ellipsoideae, ± leves. Habitatio in silvis deciduis vel coniferis prope *Betulas*. Surrey, Esher, Black Pond, 15 x 1954, ORTON 387 (holotypus, E).

Cap 45–120 mm, convex then expanded, often broadly umbonate or gibbous, sometimes slightly depressed around centre, *cinnamon* or *brick* drying cinnamon-buff or saffron-buff sometimes with sienna or saffron tinge in places, entirely adpressedly silky-fibrillose sub lente, *white* or *whitish veil forming large or small adpressed scales especially in outer part*, margin with white appendiculate veil remnants at first. – Gills adnate usually \pm emarginate, *sienna-cinnamon* or *rusty* then deeper *cinnamon* or *brick* to *rusty-tawny*, rather crowded, L 56–100, 3(7), edge paler than \pm concolorous, rather uneven to even. – Stem 60–110 \times 10–20 mm (17–40 mm broad near base), *thickened at base to markedly clavate-bulbous*, more rarely \pm equal or slightly attenuated at base, *white* or *whitish* then *discolouring buff* or *pale cinnamon*, apex silky-fibrillose of striate, *white* or *whitish veil forming thick wide often complete membranous-floccose ring and scattered patches below this*, solid, often becoming soft and spongy in the lower part, base white tomentose (often thickly so) and sometimes with white mycelial strands. – Flesh pale cinnamon or cinnamon-buff, sometimes bruising darker cinnamon or \pm brick. – Smell none or faint, fungussy.

Spores 6.5–8 \times 3–4 μ m, *fusiform-ellipsoid*, *pale sub micr.*, \pm smooth. – Basidia 4-spored. Gill-edge fertile. – Hyphae on cap 4–10 μ m broad over shorter cells up to 20 μ m broad; hyphae of veil mostly narrow 4–8 μ m broad.

Under oak and birch or in heather with scattered pine and birch. Surrey, Oxshott Heath, 21 \times 1951 (under oak and birch), coll. PEARSON & ORTON (as *C. laniger* var. *microsporus* PEARSON; no material kept; there is a description, however, in PEARSON's notebook now in K); Surrey, Esher, Black Pond (in heather with scattered pine and birch), 15 \times 1954, ORTON 387 (holo, E).

The small pale spores clearly separate this form the similarly coloured *C. laniger* Fr., which in my limited experience of it is conifer associated. It differs from *C. cremeolaniger* (see below) in white veil.

4. *Cortinarius* (*Telamonia*) *cremeolaniger* P. D. ORTON, sp. nov. – Fig. 8

C. lanigerum in mentem revocat sed a coloribus pallidioribus pilei, velo cremeo et sporis angustioribus et brevioribus differt. Pileus 60–110 mm, cinnamomeus vel ferrugineo-lateritius, siccitate pallide ochraceo-cinnamomeus, primo cremeo sericeo fibrillosus interdum fere sericeo-levis, a velo primo appendiculato pallide cremeo praecipue ad marginem versus conspicue adpresse squamulosus. Lamellae e pallide cinnamomeis obscuriore cinnamomeae vel ferrugineo-fulvae, subconfertae, L. 50–60, (1)3(7). Stipes 56–110 \times 10–18 mm, \pm clavato-bulbosus (ad basim 22–30 mm latus), albidus dein cremeo luteolobrunneus vel fere cinnamomeus, ad apicem primo opace striatus, a velo pallido cremeo vel luteolobrunneo primo peronatus dein annulatus et

maculatus. Odor nullus. Sporae 6–7.5×3–4 µm, fusiforme-ellipsoideae, ± leves. Habitatione in pinetis. Surrey, Esher, Black Pond, 28 x 1982, ORTON 5353 (holotypus, E).

Cap 60–110 mm, convex becoming expanded-convex, sometimes slightly broadly obtusely umbonate or gibbous, *sienna-cinnamon*, *cinnamon* or *rusty-brick*, *drying pale saffron-cinnamon*, adpressedly and rather markedly cream silky-fibrillose around finely silky-tomentose centre, sometimes becoming ± silky-smooth in places, *ivory* or *pale cream* (B, D) *veil forming often rather thick and adpressed scales especially in outer part*, margin with appendiculate white or whitish cortinal and pale cream veil remnants at first. – Gills adnate-emarginate sometimes with tooth, *pale cinnamon* then *fulvous-cinnamon* to *deep cinnamon* or *rusty-tawny*, fairly crowded, L 50–60, (1)3(7), edge slightly paler and uneven then ± concolorous and even. – Stem 56–110×10–18 mm (22–30 mm broad in base), ± clavate-bulbous, *whitish with marbled-stirate apex at first, soon creamy-buff or buff to ± cinnamon from base up, ivory or pale cream* (B, C, D) or *creamy-buff veil peronate at first then forming ± complete floccose-ring and scattered patches below white cortinal zone*, firm at first but soon softer and spongy in lower part, base often rather thickly white tomentose or strigose. – Flesh in cap deep cinnamon to ± brick, drying whitish or pale creamy-buff, ± concolorous under cuticle and amber or fawn horny over gills, in stem-apex clay-buff, milky-coffee, cinnamon horny-marbled, clay-buff in lower part then sometimes saffron-cinnamon or cinnamon in base or cortex. – Smell none.

Spores 6–7.5×3–4 µm, *fusiform-ellipsoid*, pale sub micr., ± smooth. – Basidia 4-spored, 30–34×6–7 µm. Gill-edge fertile. – Hyphae on cap 2–12 µm broad, hyaline or slightly yellowish encrusted pigmented with refringent walls, broader cells only occasionally visible below these; hyphae of veil on stem (2)4–8(10) µm broad, similar to those on cap of surface.

Under pine. Surrey, Esher, Black Pond, 28×1981, ORTON 5222 and 28×1982, ORTON 5353 (holo, E).

Although with similar spores and cap colours this taxon differs clearly from the white-veiled *C. lanigeroides* P. D. ORTON (see above) in the ivory or cream coloured veil and probably also in habitat with conifers. All the collections I made were from rather young pine plantation in pine needles, although there were scattered birch and sweet chestnut trees nearby. Further field work is necessary to confirm the habitat.

I believe this taxon has been found elsewhere in S. England but I do not know exact details of habitat. On account of the small spores it was named *C. pearsonii* P. D. ORTON, which has very similar spores, but *cremeolaniger* differs clearly from *pearsonii* in complete

absence of blue-violeous colours. (In *pearsonii* the young gills, stem-apex and the tomentum at the stem-base are all \pm lilac or lavender). *C. cremeolaniger* is very probably illustrated in PHILLIPS (Mushrooms and other fungi in Great Britain and Europe. Pan-books: 131, lower right fig., 1981) as *C. pearsonii*. I need to make fresh collections of *pearsonii* in order to confirm whether it is a *Sericeocybe* or a *Telamonia*.

5. *Cortinarius* (*Telamonia*) *traganulus* P. D. ORTON, sp. nov. – Fig. 9

A velo lilaceo, odore fragrante, coloribus pilei, sporis et probabiliter habitatione in *Betuletis* facile distinguitur. Pileus 22–74 mm, ferrugineo-fulvus vel lateritius, siccitate argillaceo luteolobrunneus, interdum partim ferrugineo vel aurantiaco tinctus, primo toto adpresse albedo sericeo-fibrillosus et ad marginem a velo lilaceo appendiculato decoratus vel squamulosus, senectute ad marginem versus interdum radialiter rugulosus vel ad centrum radialiter fibrillosus. Lamellae ex argillaceo-luteolobrunneis fulvae vel cinnamomeo-luteolobrunneae, subconfertae, L 32–44, 1–3. Stipes 30–105 \times 5–10 mm, vulgo ad basim incrassatus vel clavatus (8–17 mm latus), lilaceus mox argillaceus vel luteolobrunneus sed ad apicem persistentiore lilaceus, a velo lilaceo dein cremeo-luteolobrunneo annuloso-zonatus vel maculatus, primo firmus. Caro stipitis praecipue ad apicem intense caeruleo-violacea vel lilacea dein argillaceo-luteolobrunnea. Odor fortis, aromaticus interdum mordax, armeniicis vel prunis similis. Sporae (8)8.5–10(11) \times 5–6(6.5) μ m, ellipsoideae, \pm punctatae. Habitatio in *Betuletis*. Inversnessshire, Abernethy Forest, 8 ix 1971, ORTON 4349 (holotypus, E).

Cap 22–74 mm, conico-convex or convex becoming expanded-convex to \pm plane, sometimes obtusely or truncately umbonate, *rusty-tawny, brick or dark brick, drying vinaceous-buff, clay-buff or buff sometimes with \pm cinnamon centre, when drying out with rusty or apricot zone around centre or sienna margin*, at first entirely adpressed whitish silky-fibrillose scaly, centre part sometimes becoming \pm radially fibrillose with age outer part sometimes becoming radially rugulose, *veil forming lilac or livid-vinaceous then pale buff or pale saffron adpressed scales or patches and appendiculate marginal fringe at first*, when dry soaking up water like a sponge. – Gills adnate \pm emarginate, *pale vinaceous –, buff or clay-buff then fulvous, fulvous-buff or cinnamon-buff*, rather crowded, L 32–44, 1–3, sometimes veined on sides or interveined or crisped, edge concolorous, \pm even. – Stem 30–105 \times 5–10 mm (8–17 mm at base), usually thickened or slightly clavate at base, sometimes attenuated at apex, *at first blue-violet, lavender, lilac or livid-vinaceous with whitish base*, then vinaceous-buff or clay-buff from base up sometimes sienna or snuff-brown when old, apex often persistently lilac or livid-vinaceous, strongly silky-fibrillose striate with marbled streaky apex at first, *cortina and veil lilac or livid-vinaceous fading to creamy-buff or pale vinaceous-buff* and forming ring-zone and

addressed patches when fresh, cortina sometimes whitish in part, rather firm and hard at first, stuffed, extreme base white, whitish or pale cream tomentose or strigose. – Flesh in cap concolorous, drying whitish or pale buff, horny over gills, in stem creamy-buff or clay-buff but in apex lavender or lilac at first, fading to pale livid vinaceous, entirely pale to deeper buff or clay-buff when old. – Smell strong (especially after being enclosed), *spicy fruity, of apricots or pungent plums*.

Spores (8)8.5–10(11)×5–6(6.5) μm , ellipsoid, faintly punctate to punctate-rough. – Basidia 4-spored, 32–38×8–10 μm . – Gill-edge fertile. – Hyphae on cap 1–8(14) μm broad, hyaline or encrusted pigmented, some shorter broader ones up to 38 μm visible here and there. Hyphae of veil on stem 1–10 μm broad, similar.

With birch. Inverness-shire, Rothiemurchus, Lower Tullochgrue, 25 ix 1969, ORTON 3837 and 28 ix 1969, ORTON 3838; Inverness-shire, Loch-an-Eilean, 24 viii 1970, ORTON 4022; Inverness-shire, Abernethy Forest, 8 ix 1971, ORTON 4349 (holo, E).

Rather easily recognised by the combination of lilac veil and stem-apex but gills not lilac, strong smell, ellipsoid spores mostly 8.5–10 μm long and habitat with *Betula*. In colours it resembles *C. simulatus* P. D. ORTON rather strongly, but that species has blue-violaceous gills, smells of radish and has shorter broadly ellipsoid spores mostly 7–8.5 μm long, but is also *Betula* associated. I included *simulatus* in subgenus *Sericeocybe* in Cortinarius II (1958) but I am now rather doubtful if this is correct. I have not seen it for some time and need to collect fresh material again before deciding whether to transfer it to subgenus *Telamonia* or not.

When I first found *traganulus* it reminded me of *C. traganus* (FR.) FR. (hence the name) because of its colours and the fact that it had a strong smell, but it has a different smell, and is less robust than *traganus* and is associated with *Betula* not *Pinus*, as well as differing in some colour details. The colour scheme is really more like that of *C. hircinus* FR. as described in Cortinarius II, but that also is more robust and differs in other details. I am satisfied that *traganulus* belongs in subgenus *Telamonia* because it has a clearly hygrophanous cap. It will be interesting to see if it turns up in England (or continental Europe) or whether it is restricted to the Scottish Highlands.

Subgenus *Phlegmacium*

6. *Cortinarius* (*Phlegmacium*) *decoloratus* (FR. ex FR.) FR. – Fig. 5

Cap 44–160 mm, convex then expanded usually broadly umbonate or gibbous, sometimes \pm plane, *pale creamy-ochraceous* (D-E)

or pale buff often with whitish margin, sometimes pale saffron-buff or more rarely saffron-fulvous with pale buff or creamy-ochraceous margin when old, viscid when fresh, matt with atomate minutely silky sheen when dry, sometimes radially darker innately-fibrillose in outer part, when fresh with whitish, cream of yellowish-cream veil and cortinal remnants near margin. Gills adnate often emarginate or with tooth, pale creamy vinaceous-buff or very pale milky-coffee then creamy-ochraceous or creamy-buff, finally fulvous or cinnamon, rather crowded, L 40–66, 3–7, edge \pm concolorous and even. – Stem 72–125 \times 6–18 mm, \pm clavate-bulbous, (12–30 mm broad in base) shining white then whitish, pale cream or creamy-buff, silky-fibrillose striate, cortina white, veil whitish or pale cream and visible as patches below the cortinal zone at first but usually fugacious, firm at first but becoming softer in lower part, stuffed becoming hollow, base often thickly white tomentose and with copious white mycelial strands. – Flesh in cap whitish or pale cream, often darker creamy-buff under the cuticle, horny over gills and in stem-apex, in stem whitish or pale cream often creamy-buff in cortex or in the base. – Smell none or faint, sometimes slightly sickly-sweet when cut.

Spores 7–9(10) \times 5–6(6.5) μ m, subglobose or broadly ellipsoid, faintly punctate to punctate-rough. – Basidia 4-spored, 30–36 \times 7–9 μ m. – Gill-edge fertile.

With *Betula*. Ebudes, Mull, Gruiline Wood, 7 ix 1968, ORTON 3446; Perthshire, Rannoch, Black Wood, 17 ix 1968, ORTON 3447; Inverness-shire, Rothiemurchus, Loch-an-Eilean, 26 ix 1979, no material kept; Inverness-shire, Abernethy Forest, 8 ix 1971, ORTON 4232; Perthshire, Dall Wood, Rannoch, 15 ix 1971, ORTON, 4233; Perthshire, Kinloch Rannoch, 28 ix 1971, ORTON 4234.

The above description replaces the compiled one I gave in *Cortinarius* I (p. 66). I am now satisfied that the older interpretation of this name by LANGE, PEARSON and other is correct and that that of MOSER in *Cortinarien Studien* I (*Sydowia* 5: 539) said to be sensu GILLET and from which I compiled my 1955 description is incorrect. For some time now MOSER also has abandoned his 1951 concept and follows LANGE and others.

As I now interpret it *decoloratus* is recognised by habitat with *Betula*, pale colours, cap viscid when fresh, subglobose or broadly ellipsoid spores, white fresh stem and whitish rather fugacious veil. It can be quite robust. It is easily confused with taxa belonging to the *anomalus* group, but is paler than any of those. Although *tabularis* is perhaps nearest in colour, that always has the cap more coloured, is not viscid and is less robust. My description of *tabularis* in *Cortinarius* II (p. 116) is unfortunately inaccurate since I included in it *decoloratus* as I now understand it. I need to do more field work

before redescribing *tabularis*, but the cap is always to some extent clay-buff, buff-cinnamon or milky-coffee and not viscid though when very wet it may get slightly sticky. The cap is frequently \pm orbicular in shape and the stem usually more slender. The other members of this group are all more deeply coloured mostly with blue-violaceous tints in some part when fresh. I have never seen any trace of blue-violaceous tints in *decoloratus* nor in *tabularis*.

Subgenus *Sericeocybe*

7. *Cortinarius* (*Sericeocybe*) *diabolicus* Fr. – Fig. 6

Cap 25–84 mm, convex or conico-convex then expanded \pm plane, sometimes obtusely umbonate or slightly depressed around centre, margin incurved at first later sometimes upturned or wavy-lobed, at first *lead-en-grey sometimes with clay-buff, milky-coffee or umber tinge in centre or entirely so, soon clay-buff or creamy-buff in centre gradually darkening to saffron, sienna or cinnamon*, margin sometimes persistently lead-en-grey but becoming clay-buff to \pm snuff-brown or concolorous with centre, very slightly sticky when fresh and wet but soon dry and matt with marked white silky sheen, outer part occasionally wrinkled-rugulose striate or radially dark-streaky, at first with whitish or very pale creamy-buff veil traces. – Gills adnate with tooth or slightly emarginate, *pale vinaceous-grey or lead-en-grey then clay-buff or milky-coffee* (sometimes deeply so), finally fulvous to cinnamon or rusty-cinnamon, rather crowded, L 32–56, (1)3(7), occasionally veined on sides or interveined or anastomosing, edge slightly paler than colourous and \pm even. – Stem 32–110 \times 4–10 mm (6–16 mm at base), usually thickened downwards or slightly clavate-bulbous rarely equal, *pale to fairly deep lead-en-grey, vinaceous-grey or lilac-vinaceous-grey with white base then whitish or creamy-buff to buff with apex more persistently vinaceous-grey*, white or whitish cortina usually leaving well-marked ring-zone, *whitish or pale creamy-buff veil rather sparse* but sometimes forming a few usually fugacious scattered patches below the cortical zone, finely silky-striate and shining elsewhere, firm and stuffed at first often becoming \pm hollow, base white tomentose, often thickly so. – Flesh in cap whitish or tinged lead-en-grey then pale buff drying whitish, sometimes horny over gills or in stem-apex, *in stem at first rather deep bluish-lavender or lilac-vinaceous-grey at least in upper part*, fading to lead-en-grey then clay-buff to buff or ochraceous, soon pale creamy-buff in stem-base and \pm entirely so when old but sometimes whitish in upper part, apex sometimes persistently lead-en-grey or pale milky-coffee. – Smell often strong, especially when cut, sickly-sweet.

Spores (7)7.5–9.5(10) \times 5.5–7(7.5) μ m, subglobose or broadly

ellipsoid, finely to fairly strongly punctate-rough. – Basidia 4-spored. – Gill-edge fertile.

Under various deciduous trees along hedges, in copses or in woods. Norfolk, Surlingham, Wheatfen Broad, 22 ix 1964, ORTON 2577 and 14 x 1969, ORTON 3834; Norfolk, West Harling, 11 x 1970, ORTON 4019.

In Cortinarius II (p. 97) I keyed out *C. diabolicus* FR. but left it in brackets since I had not found it up to that time. Since then I have found it repeatedly in certain areas in Norfolk and so have been able to present the above full description of British material. The details I gave in my key in 1958 need amplifying and could be amended thus: Stem with sparse veil, usually soon \pm smooth below cortinal zone; cap leaden-grey, clay-buff or milky-coffee at first but becoming saffron, sienna or cinnamon, with white silky sheen; in woods; (gills pale vinaceous-grey or leaden-grey then clay-buff or milky-coffee finally \pm fulvous or cinnamon).

The sparse veil and dull coloured young gills together with white silky sheen on cap and presence of blue-violaceous colours in some part when fresh are the diagnostic features. Although somewhat similarly coloured, *anomalus* has a grey silky sheen on the cap and copious yellowish veil and *lepidopus* has the cap \pm umber or cinnamon and also has copious veil; *epsomiensis*, although also without marked veil, has the cap and gills more brightly coloured and lacks blue-violaceous tints in any part.

There must always be a little doubt about the correct use of Friesian epithets in this genus, but the original diagnosis is sufficiently in agreement with my description to hope that it is correctly named. In my experience the *anomalus* group does not seem to be associated with particular trees so much as with particular habitats, and it may be that the presence of boulder-clay or somewhat basic soil in Norfolk may suit *diabolicus* best. Although *lepidopus* is characteristic of pine and birch woods on acid soil, *anomalus*, which may also be found there, is also found in basic woodland. We have much to learn yet about habitat preferences for this group, but first we must learn to name the species correctly!

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