

NOTULAE AD FLORAM AGARICINAM NEERLANDICAM – XXI
Lepiota section Stenosporae

ELSE C. VELLINGA¹ & HENK A. HUIJSER²

Descriptions are given of five species of *Lepiota* sect. *Stenosporae* with grey-brown to dark green pileus. *Lepiota tomentella* sensu Candusso & Lanzoni (1990) is described as *L. pilodes* Vellinga & Huijser and *L. griseovirens* sensu Reid (1972) as *L. poliochloodes* Vellinga & Huijser. *Lepiota pseudofelina* J. Lange is regarded as a nomen dubium. *Lepiota fulvella* Rea is synonymous with *L. boudieri* Bres.

Lepiota sect. *Stenosporae* (J. Lange) Kühner is microscopically characterized by the shape of the spores. These are provided with a lateral outgrowth at base, called a spur, or are triangular in outline (in side view). Characteristics to distinguish species in this section are colour of the basidiocarp, shape and size of the spores and shape, size, septation and pigmentation of the elements of the pileus covering.

Several species complexes occur and much confusion about names and delimitation of the species involved exists in literature. The group of the brownish grey to dark green species with a pileus covering made up of more or less erect cylindrical elements (*L. tomentella* J. Lange, *L. pseudofelina* J. Lange, *L. griseovirens* Maire, and *L. grangei* (Eyre) Kühner) and the complex of *L. fulvella* Rea and *L. boudieri* Bres. are treated in this paper.

Fresh and herbarium material of all species involved have been studied carefully; type material of several taxa has been studied. Spores are measured in 5% KOH_(aq) or 10% NH_{3(aq)}, stained by Congo red; spores are measured in side view, length from apex to spur and width including spur. The notation [130/5/3] stands for '130 spores from 5 basidiocarps of 3 collections measured'. The following abbreviations are used: K. & W. – Kornerup, A. & Wanscher, J.H., Methuen handbook of colour; Farver i farver. Mu. – Munsell soil color charts, Q – quotient of length and width, av. Q – average quotient, av. l – average length, av. w – average width.

I. The group of brown-grey to (dark) greenish species

Since the publication of the dark green and green species *L. grangei*, *L. griseovirens*, and *L. pseudofelina* many authors have tried to interpret these names. Kühner (1934) wrestled with the differences between *L. grangei* and *L. griseovirens*, Romagnesi & Locquin (1944) devoted part of a paper to all green *Lepiota*-species, giving interpretations of *L. griseovirens* and *L. grangei*; and more recently Migliozi & Coccia (1990) tried to interpret the description of *L. pseudofelina*. The interpretation of the original, and of later

1) Rijksherbarium / Hortus Botanicus, P.O. Box 9514, 2300 RA Leiden, The Netherlands.

2) Frederikstraat 6, 5671 XH Nuenen, The Netherlands.

descriptions is hampered by the, in our eyes, inadequate and not very exact descriptions in former days, especially concerning spore size and shape and the shape and size of the elements of the pileus covering.

Another problem is the variation of the taxa concerned. During the development from closed to expanded pileus the colours change, due to discolouration of the context and in *L. grangei* e.g. the pigment is soluble in H₂O (rain). It is possible that young specimens have been described as independent taxa, for instance *L. griseovirens* ssp. *obscura* (Locquin, 1945). Other characteristics like spore size also show a wide variation within one species; most specimens produce some 2-spored basidia between the normal 4-spored basidia. Spores of 2-spored basidia are longer and have a more pronounced spur than normal spores.

The most important and reliable characteristics are spore size (though variable) and shape, and the type of covering of pileus and stipe and the size, shape and pigmentation of the elements. The species involved can be unequivocally identified by using microscopic characteristics only.

Lepiota tomentella J. Lange — Fig. 1

Lepiota tomentella J. Lange, Dansk bot. Ark. 4 (4) (1923) 48.

Excluded. *Lepiota tomentella* sensu Candusso & Lanzoni, Fungi eur. 4 (1990) 226–228; sensu M. Bon, Docum. mycol. 11 (43) (1981) 36–37; sensu Kelderman, Coolia 31 (1988) 43–44 (= in all cases *L. pilodes*).

Selected illustrations. J. Lange, Dansk bot. Ark. 4 (4) (1923) pl. 1d; J. Lange, Fl. agar. dan. 1 (1935) pl. 14D.

Selected descriptions and figures. M. Bon, Bull. trimest. Soc. mycol. Fr. 92 (1976) 324–326, fig. 6; P.D. Orton, Trans. Br. mycol. Soc. 91 (1988) 562.

Characteristics. Pileus when young with pinkish brown or greyish brown tinges, showing no orange discolouring with age; spores av. l × av. w = 7.6–9.0 × 3.5–3.8 μm, av. Q = 2.1–2.4; cheilocystidia 5–12 μm broad; elements on pileus long, up to 320(–440) μm, with 0–2(–3) clampless septa.

Pileus 10–28(–34) mm, when young paraboloid to campanulate with inflexed margin, expanding to convex, plano-convex or slightly plano-concave with low broad umbo, at centre dark grey-brown, ochre brownish or grey-brown with pinkish tinge (Mu. 7.5 YR 3/4, 5 YR 3–5/3–4, K. & W. 7–8E4, 7F6–5, 5–6D6), paler towards margin: ± pepper & salt colour (7.5 YR 5–7/4), felted at centre, around centre flocculose-felty or broken up in more or less distinct appressed or slightly uplifted felty squamules; margin with some white velar remnants when young. Lamellae, L = 28–44, l = 1–3, rather crowded or crowded, free, (sub)ventricose, up to 5 mm broad, whitish at first, later cream or pale beige with slight pinkish reflex, with whitish finely flocculose edge. Stipe 15–50 × 2–4.5(–6.5) mm, cylindrical and mostly with broadened base, subfistulose, when young whitish, cream-brown, finely fibrillose, later from base upwards reddish brown, pale brown rusty, in lower 1/2 to 2/3 with scattered squamules and girdles, like covering on pileus, without distinct annulus, when young sometimes with a white fugacious ring-zone, with white mycelium cords at base. Context in pileus whitish cream, in stipe white at first, later brownish or pale brown. Smell indistinct to slightly sweetish. Taste slightly bitter. Spore print colour white.

Spores [170/12/11] in side view $(6.4-7.0-9.6(-10.4) \times 3.2-4.2(-4.5) \mu\text{m}$, av. $l \times$ av. $w = 7.6-9.0 \times 3.5-3.8 \mu\text{m}$, $Q = 1.7-2.7$, av. $Q = 2.1-2.4$, with straight or outgrown broad spur, sometimes allantoid or phaseoliform, mostly rather cylindrical, some attenuate towards base, in frontal view subcylindrical, pale brown or orange-brown in Melzer's reagent, red in Congo red; wall not coloured in cresyl blue, \pm swollen in 10% $\text{NH}_3(\text{aq})$ plus 10% $\text{CH}_3\text{COOH}(\text{aq})$. Basidia $(16.5-20-32 \times 6-9.5 \mu\text{m}$, 4-spored, rarely (3-)2-spored. Lamella edge sterile; cheilocystidia $(17-20-40(-48) \times 5-12 \mu\text{m}$, cylindrical,

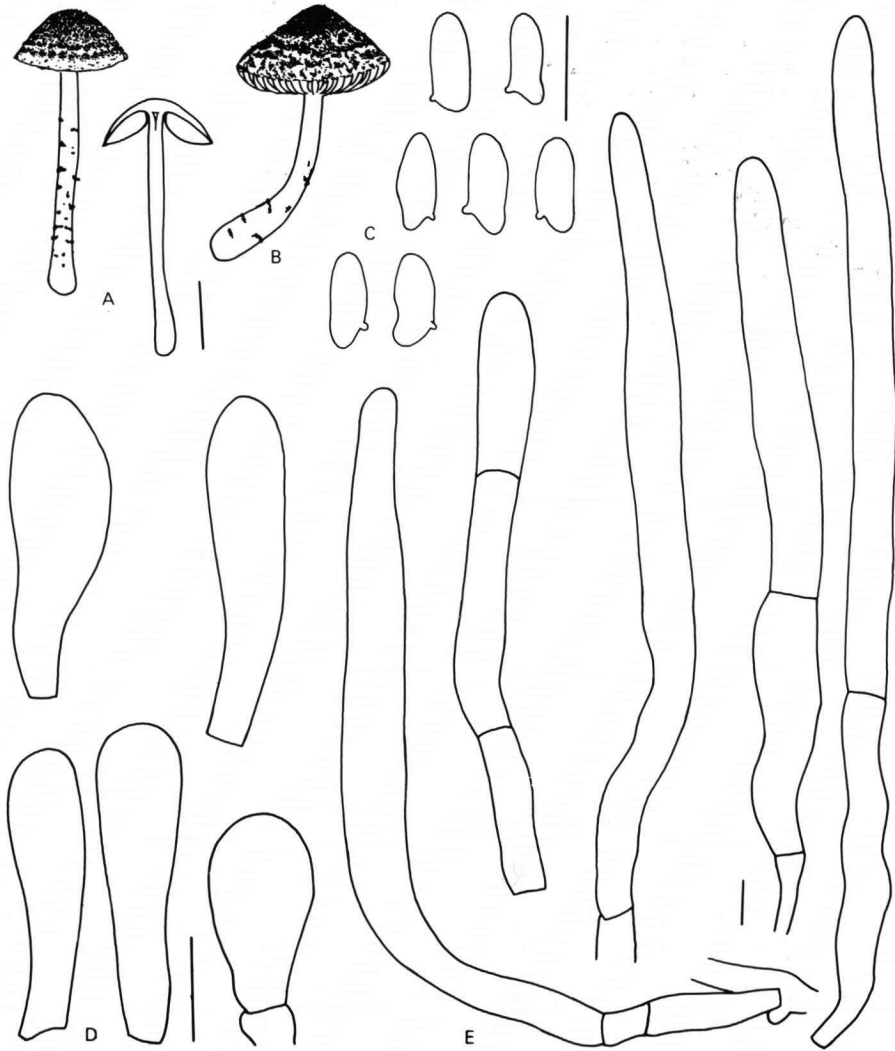


Fig. 1. *Lepiota tomentella*. A, B. Basidiocarps; C. spores; D. cheilocystidia; E. elements of pileus covering. — A from Huijser, 21.IX.1986, B from Huijser 30.X.1982, C, D, and E from neotype. — Scale bar basidiocarps 10 mm, scale bar with microscopic characteristics 10 μm .

narrowly clavate, or rarely narrowly utriform, slightly thick-walled, not coloured. Pleurocystidia not observed. Pileus covering a trichoderm, made up of cylindrical elements, (35–)45–320(–440) × 6–19 µm, with 0–2(–3) clampless septa, with coloured, slightly thickened walls, mostly narrowed into a pedicel, clamped at base. Stipitipellis a cutis of cylindrical hyphae, 2–8 µm in diam., with some patent colourless hyphae; squamules on stipe made up of brown-walled elements, as on pileus, but shorter, 30–160 × 5.5–15(–18.5) µm. Clamp-connections present in all tissues.

Habitat & distribution. Gregarious or more rarely solitary, terrestrial in deciduous woods on rich loamy-sandy soils, often rich in lime, in the Netherlands very rare, only in southern Limburg (Cadier en Keer, Örenberg and Riesenberg; Valkenburg, Schaelsberg and St. Jansbosch). Known from Belgium, France, Denmark, Germany, and England, everywhere rare except in England. End of August to October.

Collections examined. NETHERLANDS: prov. Limburg, Cadier en Keer, Örenberg, 4.X.1989, E.C. Vellinga 1612 and 9.X.1991, E.C. Vellinga 1776 (L); Cadier en Keer, Riesenberg, 30.X.1982, H.A. Huijser (L); Valkenburg, Schaelsberg, 21.IX.1986, H.A. Huijser (L) and 23.X.1991, H.A. Huijser (L). — BELGIUM: prov. Liège, Aywaille, 15.IX.1981, J. Schreurs 626 (L); prov. Namur, Nismes, 30.IX.1984, G.A. de Vries (L); Source d'Ave, 11.IX.1975, G. Tjallingii-Beukers (L); Resteigne, Bois de Resteigne, 5.X.1977, C. Bas 7234 (L). — DENMARK: Falster, Oct. 1939, J. Lange (C); Sjaelland, Parnas near Sorø, students' excursion (neotype) (C); Bangsebro Skov, 25.IX.1960, L. Døssing (C); Hamborgskoven, 11.IX.1960, F.H. Møller (C); Systofte Skov, 6.X.1960, L. Døssing (C). — FRANCE: dépt Pas-de-Calais, Forêt de Guines, 13.X.1991, J. Schreurs (coll. E.C. Vellinga 1785) (L).

Unfortunately no type material of *L. tomentella* is preserved at the Herbarium at Copenhagen (C). Recent freeze dried material [collected by students' excursion, 27 Sept. 1980, Denmark, Sjaelland, Parnas near Sorø, (C)] is chosen as neotype (see Fig. 1).

Several authors, e.g. Candusso & Lanzoni (1990), describe *L. tomentella* as a species with fulvous and ochraceous colours at the pileus, with broad cheilocystidia and with elements of the pileus covering without septa. Lange (1923) states that his species is pale brown argillaceous, with narrow (7 µm) cheilocystidia; information about size and shape of the pilear elements is not given. Basidiocarps agreeing with the macroscopical description of Lange (1923) always have septate elements of the pileus covering and narrow cheilocystidia. *Lepiota tomentella* in the sense of Candusso & Lanzoni differs sufficiently from *L. tomentella* in the original sense to warrant a description as a new species (see below).

Lepiota pilodes Vellinga & Huijser, *spec. nov.* — Fig. 2

Misapplied name. *Lepiota tomentella* sensu Candusso & Lanzoni, Fungi eur. 4 (1990) 226–228; sensu M. Bon, Docum. mycol. 11 (43) (1981) 36–37; sensu Kelderman, Coolia 31 (1988) 43–44.

Selected description & figure. Candusso & Lanzoni, Fungi eur. 4 (1990) 226–228, fig. 42 (as *L. tomentella*).

Ex affinitate *Lepiotae tomentellae* et *L. poliochlooidis*.

Pileus 13–34 mm latus, campanulatus, dein convexus vel plano-convexus, velo obtectus, si cum ceteris comparatur, tenui, disco tomentosus, squamulis parvis velutinis et mollissimis, prima aetate fuscocinereus, cito canastro-flaveo-fuscus supra fundum carnis ochraceo-aurantiacae. Lamellae liberae, albiae vel cremeae, interdum aurantiaco-maculatae. Stipes 15–50 × 2–4 mm, obtectus squamulis dispersis et cingulis non bene compositis, coloribus eisdem ac pilei, cremeus, versus basim aurantiacus, badius in senescendo. Odor debilis, haud similis ei *L. cristatae*.

Sporae (6.8–)7.2–10.2(–11.6) × (3.0–)3.2–4.2(–4.6) μm, Q = 1.9–2.8(–3.0), calcarigerae. Cellulae steriles aciei lamellarum 5–15(–18) μm latae. Cellulae squamularum pilei erectae, elongatae, usque 280(–330) μm longae, sine septo (perraro cum uno septo), pigmento membranario subfusco. Fibulae numerosae adsunt.

In silvis frondosis ubero luteo solo, vel in fuis lapidibus excisis e metallis, autumno.

Typus: 'E. C. Vellinga 1603, 4.X.1989, the Netherlands, Cadier en Keer, Örenberg. L.'

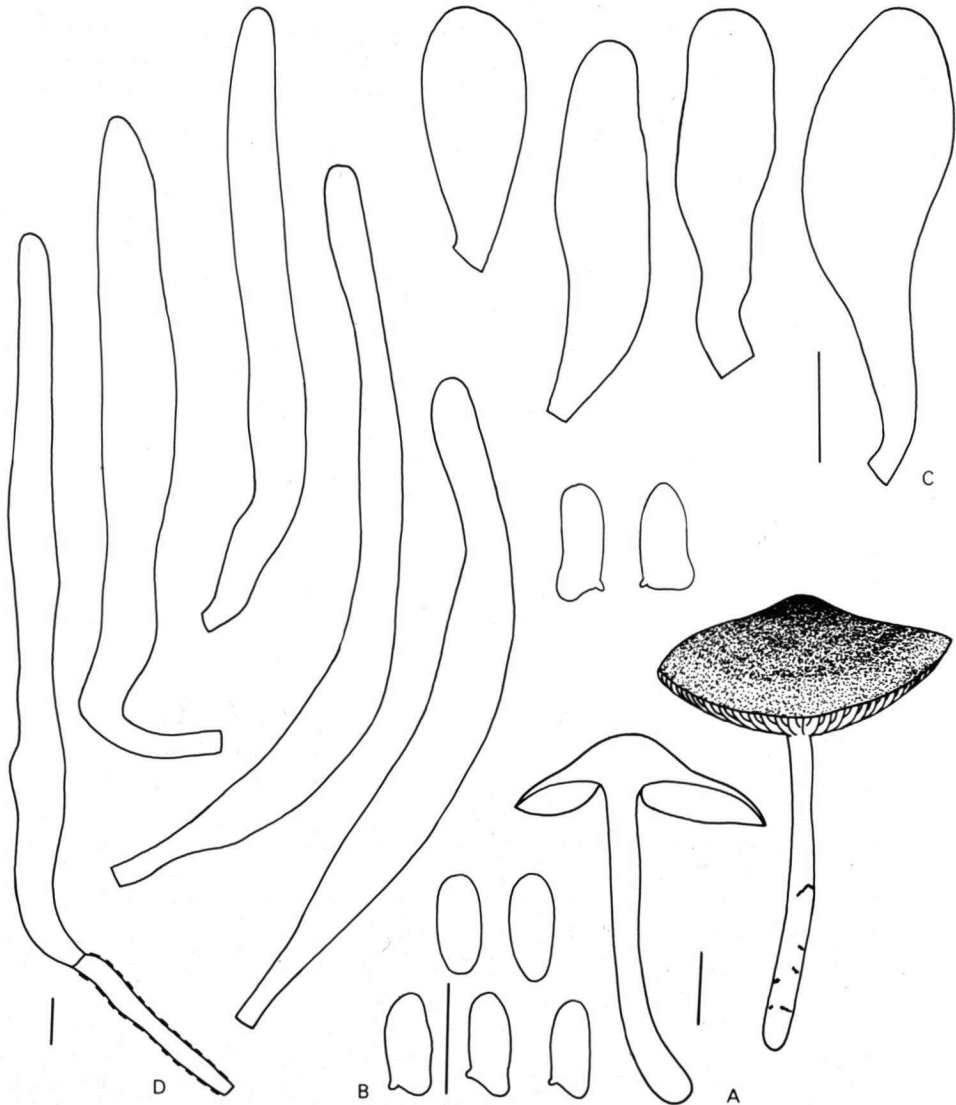


Fig. 2. *Lepiota pilodes*. A. Basidiocarp; B. spores; C. cheilocystidia; D. elements of pileus covering. — All from holotype. — Scale bars as in Fig. 1.

Characteristics. Pileus when very young with dark greyish or fuliginous covering sometimes with a hue of green or olive, with context rapidly discolouring orange, later on more beige-brown and context fading to ochre, sometimes strongly resembling *L. poliochloodes* or when old *L. tomentella*; spores av. l \times av. w = 7.8–9.6 \times 3.5–3.8 μm , av. Q = 2.2–2.6; cheilocystidia broad, 5–15(–18) μm ; elements of pileus long, up to 280(–330) μm , mostly without septa.

Pileus 13–34 mm, expanding from campanulate to convex or plano-convex, with or without broad umbo, when young with margin exceeding lamellae, at centre dull orange brown, dark brown or ochraceous brown (Mu. 2.5 YR 4/4, 10 YR 3–4/4), towards margin fading to pale brown-beige (e.g. 10 YR 7/6), at first at outmost margin very pale, when very young and undamaged with dark fuliginous colours sometimes with a hue of green or olive, discolouring orange when touched and with age, completely covered with a relatively thin covering of small plush-like squamules, at centre closed and velutinous-tomentose, towards margin more fibrillose to arachnoid with context showing in between squamules. Lamellae, L = 31–35, l = 1–3, moderately distant to rather crowded, free, not or slightly cream-coloured, with age more orange brownish tinged or with orange-brown spots, with whitish or white, even to flocculose edge. Stipe 15–50 \times 2–4 mm, cylindrical with broadened to bulbous base, fistulose, cream to pale pinkish cream at base, discolouring orange to reddish brown especially at base, lengthwise innately fibrillose, in upper half more or less pruinose, lower with faint girdles and scattered squamules (rarely without), concolorous with pileus, with white mycelium cords at base. Context in pileus white and dull, in stipe creamy, especially in cortex discolouring orange, with age in lower part reddish brown (5 YR 4/4). Smell faint, sweetish, fruity-fungoid or farinaceous, not like *L. cristata*. Taste not known. Spore print colour white.

Spores [160/12/9] in side view (6.8–)7.2–10.2(–11.6) \times (3.0–)3.2–4.2(–4.6) μm , av. l \times av. w = 7.8–9.6 \times 3.5–3.8 μm , Q = 1.9–2.8(–3.0), av. Q = 2.2–2.6, cylindrical, subcylindrical, with rounded apex or tapering towards apex, without or with lateral spur, with rounded or spur-like base, in frontal view subcylindrical or ovoid, with distinct patent hilar appendage, red-brown in Melzer's reagent, red in Congo red; wall not colouring in cresyl blue, slightly swelling in 10% $\text{NH}_3(\text{aq})$ plus 10% $\text{CH}_3\text{COOH}(\text{aq})$. Basidia (19–)22–34(–38) \times 6.5–9.5 μm , 4-spored, also some 2-spored. Lamella edge sterile; cheilocystidia (16–)20–45(–50) \times 5–15(–18) μm , narrowly clavate, clavate, narrowly utriform to more or less cylindrical, not coloured. Pleurocystidia not observed. Covering of pileus made up of erect cylindrical to slightly fusiform elements, 60–280(–330) \times (6.5–)8–21 μm , narrowed into pedicel, without (very rarely with one) clampless septa, with some basal clavate elements in between, with membranal and intracellular brown pigment, when fresh also with grey colours. Stipitipellis a cutis of narrow 2–6.5 μm wide cylindrical hyphae; squamules on stipe made up of elements as those on pileus but 25–160 \times 8–23 μm . Clamp-connections present in all tissues.

Habitat & distribution. Gregarious in small groups, often together with *L. tomentella* and other *Lepiota*-species, in deciduous forests on rich loamy soils, also on mine waste heaps. In the Netherlands only known from some localities in southern Limburg. Known from France, Germany and Italy. September and October.

Etymology. $\pi\iota\lambda\omega\delta\eta\varsigma$ = tomentose.

Collections examined. NETHERLANDS: prov. Limburg, Bemelen, 10.X.1990, H.A. Huijser (L), 9.X.1991, E.C. Vellinga 1781 (L); Cadier en Keer, Örenberg, 4.X.1989, E.C. Vellinga 1603 (holotypus) (L), 9.X.1991, E.C. Vellinga 1777 (L), Cadier en Keer, Riesenberg, 4.X.1989, E.C. Vellinga 1621 (L); Kerkrade, mine Laura-Julia, 8.IX.1980, P.H. Kelderman 891 (L) and 26.X.1991, H.A. Huijser (coll. E.C. Vellinga 1814) (L); Valkenburg, Schaelsberg, 26.IX.1990, H.A. Huijser (L). — GERMANY: Rheinland-Westfalen, Mönchengladbach, 18.X.1984, H. Bender (Herb. Bender).

Lepiota pilodes differs from *L. tomentella* in the orange to ochraceous discolouration of the pileus surface, the broad cheilocystidia and the mostly non-septate elements of the pileus covering.

In dry conditions basidiocarps do not always show the orange-like discolouration of the pileus very well, but they have more ochraceous tinges. The same applies to older specimens. In those cases, microscopical data are of paramount importance for the identification.

Lepiota poliochloodes Vellinga & Huijser, *spec. nov.* — Fig. 3

Misapplied name. *Lepiota griseovirens* sensu D. Reid, Fung. rar. Ic. col. 6 (1972) 14–16; *Lepiota griseovirens* var. *griseovirens* sensu M. Bon, Docum. mycol. 11 (43) (1981) 38.

Selected illustrations. Knudsen & Vesterholt, Truede Storsvampe Danmark (1990) 33 (as *L. griseovirens*); D. Reid, Fung. rar. Ic. col. 6 (1972) pl. 43c, d (as *L. griseovirens*).

Selected description & figures. D. Reid, Fung. rar. Ic. col. 6 (1972) 14–16 (as *L. griseovirens*).

Ex affinitate *Lepiotae pilodis* et minore modo *L. griseovirentis*.

Pileus 10–31 mm latus, campanulatus, convexus, dein applanatus et leviter obtuse umbonatus, velo tenui obtectus, disco tomentosus, squamulis parvis fibrillosis, glauco-canus vel pallido-olivaceo-brunneus supra fundum carnis roseo-luteae vel pallide aurantiaco-brunneolae. Lamellae liberae, cremeae, in senescendo pallide aurantiaco-brunneolae. Stipes 20–55 × 2–4 mm, squamulis dispersis et cingulis non bene compositis coloribus eisdem ac pilei obtectus, versus basim aurantiacus in senescendo. Odor debilis, haud similis ei *L. cristatae*.

Sporae (5.8–)6.0–8.0(–8.8) × (3.2–)3.4–4.4(–4.7) μm, Q = 1.4–2.3, basi rotundato vel truncato, raro calcarigeras. Cellulae steriles aciei lamellarum 4–10(–11) μm latae. Cellulae squamularum pilei erectae, (45–)70–180(–200) × 6.5–20(–26) μm, elongatae, medio dilatatae, cum uno septo vel sine septo, pigmento membranario brunneo. Fibulae numerosae adsunt.

In silvis frondosis ubero luteo vel arenoso solo, et in fuis lapidibus excisis e metallis, mense octobri.

Typus: 'H.A. Huijser (coll. E.C. Vellinga 1788), 15.X.1991, France, dépt Pas-de-Calais, Forêt de Hardelot. L.'

Characteristics. Macroscopically resembling *Lepiota pilodes*, but covering on pileus slightly more greenish or less greyish, microscopically with shorter spores (av. l × av. w = 6.6–7.4 × 3.7–4.1 μm, av. Q = 1.7–2.0) and cheilocystidia less broad (4–11 μm). Also resembling *Lepiota griseovirens*, but less black when young, floccules on pileus and stipe often less developed, spores little shorter, elements of pileus and stipe shorter and more clavate. In fresh material all elements full of little granules or oil drops.

Pileus 10–31 mm, when young spherical to ellipsoid, expanding to convex, campanulate, finally appanate with low obtuse umbo, at first with a closed, relatively thin covering, green-grey, grey-olive, grey-brown, light olive-brown (Mu. 5 Y 6–5/3–4, 10 YR 5–2/3, 2.5 YR 6–5/2–4), towards margin splitting up into very small fibrillose squamules with age; underlying context discolouring, pink-yellow to light orange-brown (10 YR 8–

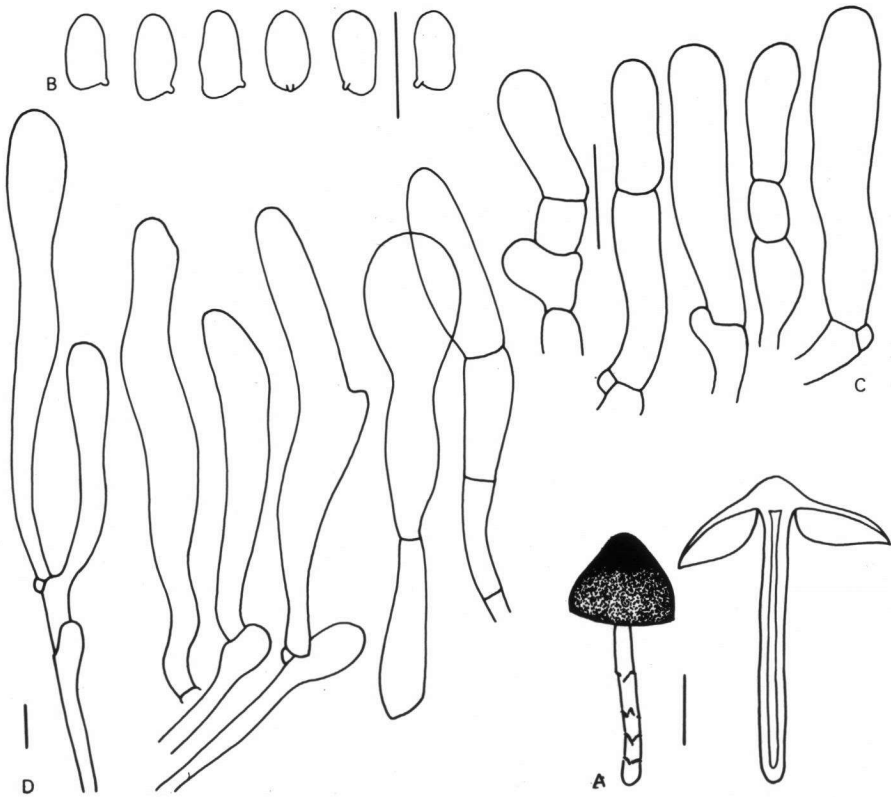


Fig. 3. *Lepiota poliochloodes*. A. Basidiocarps; B. spores; C. cheilocystidia; D. elements of pileus covering. — All from holotype. — Scale bars as in Fig. 1.

7/6–8, 2.5 Y 8–7/6–8); margin when young fringed by velar remnants, exceeding lamellae. Lamellae moderately crowded, L = 36–42, l = 1–3(–7), free, (sub)ventricose, up to 4 mm broad, rounded near stipe, cream-coloured, with white somewhat flocculose edge, discolouring light orange-brown on handling and with age. Stipe 20–55 × 2–4 mm, slightly broadening downwards, when young white and lengthwise fibrillose, with scattered squamules and girdles like covering on pileus, at base discolouring orange when touched and with age. Context in pileus white, in stipe white at first, in lower parts later on mainly in the cortex brown-orange to red-brown. Smell faint, slightly sweetish or unpleasant, not like *L. cristata*. Taste unknown. Spore print colour white.

Spores [125/7/4] in side view (5.8–)6.0–8.0(–8.8) × (3.2–)3.4–4.4(–4.7) μm, av. l × av. w = 6.6–7.4 × 3.7–4.1 μm, Q = 1.4–2.3, av. Q = 1.7–2.0, mostly oblong to cylindrical, with rounded or truncate base, more rarely with distinct spur, showing lateral hilar appendage, in frontal view more ellipsoid, orange-brown in Melzer's reagent, red in Congo red; wall not coloured in cresyl blue, not or scarcely swelling in 10% NH₃(aq) plus 10% CH₃COOH(aq). Basidia 20–32 × 6.0–9.0 μm, 4-spored, some (3-)2-spored. Lamella edge sterile; cheilocystidia (12–)16–35(–40) × 4–10(–11) μm, variable in shape,

long and slender, \pm cylindrical, short clavate, narrowly utriform, often with basal broad element, colourless with fine granular contents when fresh. Pleurocystidia not observed. Covering on pileus rather irregular and made up of elements $(45\text{--}70\text{--}180\text{--}200) \times 6.5\text{--}20\text{--}26$ μm , often broadened at middle and narrowed into pedicel, with 0–1(–2) clampless septa, with short clavate elements in between; pigment brown, membranous, in lower parts also intracellular, in basal parts of terminal elements incrusting. Stipitipellis a cutis of narrow hyphae, 1.5–6.5 μm broad; elements of squamules and girdles as those on pileus or shorter $25\text{--}120\text{--}180) \times 9\text{--}25\text{--}33$ μm . Clamp-connections present in all tissues. In fresh material all elements are full of little granules or oil drops; sometimes these granules are also visible in exsiccata.

Habitat & distribution. Gregarious in small groups in deciduous forests on rich soils, loamy or sandy, but also on mine waste heaps; very rare in the Netherlands, only known from Valkenburg (Schaelsberg) and Kerkrade (Laura-Julia). Known from Denmark, France and Great Britain, apparently very rare. October.

Etymology. $\rho\omicron\lambda\iota\omicron\varsigma$ = grey; $\chi\lambda\omicron\omega\delta\eta\varsigma$ = greenish.

Collections examined. NETHERLANDS: prov. Limburg, Valkenburg, Schaelsberg, 20.X.1991, P.J. Keizer (L), 23.X.1991, H.A. Huijser (L); Kerkrade, mine Laura-Julia, 26.X.1990, H.A. Huijser (L). — FRANCE: dépt Pas-de-Calais, Forêt de Harellet, 15.X.1991, H.A. Huijser (coll. E.C. Vellinga 1788) (holotype) (L).

For discussion see under *L. griseovirens*.

Lepiota griseovirens Maire — Fig. 4

Lepiota griseovirens Maire, Bull. trimest. Soc. mycol. Fr. 44 (1928) 37.

Lepiota griseovirens ssp. *obscura* Locq., Bull. mens. Soc. linn. Lyon 14 (1945) 61–62 (nom. nud.). — *Lepiota griseovirens* var. *obscura* M. Bon, Docum. mycol. 6 (24) (1976) 44. — *Lepiota obscura* (Locq.) Babos, Annls hist.-nat. Mus. natn. Hung. 50 (1958) 89 (nom. nud.).

Lepiota grangei f. *brunneoolivacea* Pilát, Acta Mus. nat. Prag. 11B (1955) 9.

Excluded names. *Lepiota griseovirens* sensu D. Reid, Fung. rar. Ic. col. 6 (1972) 14–16; *Lepiota griseovirens* var. *griseovirens* sensu M. Bon, Docum. mycol. 11 (43) (1981) 38 (in both cases *L. poliochloodes*).

Selected illustrations. Candusso & Lanzoni, Fungi eur. 4 (1990) pl. 22a, 22b (as *L. griseovirens* and *L. pseudofelina* resp.); Lanzoni & Candusso, Boll. Gr. micol. G. Bresadola 26 (1983) 104; Migliozi & Coccia, Boll. Ass. micol. ecol. rom. 19 (1990) 20 (as *L. pseudofelina*).

Selected descriptions & figures. Van de Bergh, Coolia 23 (1980) 54–56 (as *L. grangei*); Candusso & Lanzoni, Fungi eur. 4 (1990) 218–220, 223–225, figs. 40, 41 (as *L. griseovirens* var. *griseovirens* and *L. pseudofelina* resp.); Courtecuisse, Bull. semest. Soc. mycol. Nord 42 (1988) 8–9, figs. 12–14; Kühner, Bull. trimest. Soc. mycol. Fr. 52 (1936) 236–237 (as *L. pseudofelina*); Lanzoni & Candusso, Boll. Gr. micol. G. Bresadola 26 (1983) 103–107, fig. 2; Migliozi & Coccia, Boll. Ass. micol. ecol. rom. 19 (1990) 17–19 (as *L. pseudofelina*); A. Pearson, Trans. Br. mycol. Soc. 29 (1946) 192 (as *L. pseudofelina*); Romagn. & Locq., Bull. trimest. Soc. mycol. Fr. 60 (1944) 54–55.

Characteristics. Young pileus especially at centre dark grey-, black- or soot-coloured mixed with some shade of green, olive, blue or violet, slowly discolouring orange-brown or ochre-brown with age, macroscopically resembling *L. poliochloodes* and *L. grangei*; spores av. $l \times av. w = 7.0\text{--}9.0 \times 3.5\text{--}4.1$ μm , av. $Q = 1.8\text{--}2.4$; cheilocystidia $20\text{--}42 \times 5\text{--}10.5$ μm ; elements on pileus tightly packed up to $320\text{--}400$ μm long, sometimes in lower parts with 1(–2) clampless septa.

Pileus 12–32 mm, at first conico-campanulate, expanding to plano-convex or slightly plano-concave with broad umbo, when young with whitish margin exceeding lamellae, at centre with a closed velvety-tomentose covering with small tufts (plush-like), dark grey to black or greyish olive-brown, sometimes with a hue of green, blue or violet, towards margin cracked into small wart-like squamules, paler than at centre to pale olive-beige brownish or grey-brown (Mu. 2.5 YR 3/2, 5 Y 2.5/1 to 2.5 Y 7/6, 2.5 Y 6/2, 10 YR 6/4) on a pale cream to isabella background, slightly pallescent and more brownish with age and sometimes discolouring yellow-brown, orange-brown or salmon-brown at margin. Lamellae, L = 36–41, l = 1–5, crowded, free, subventricose or ventricose and round-

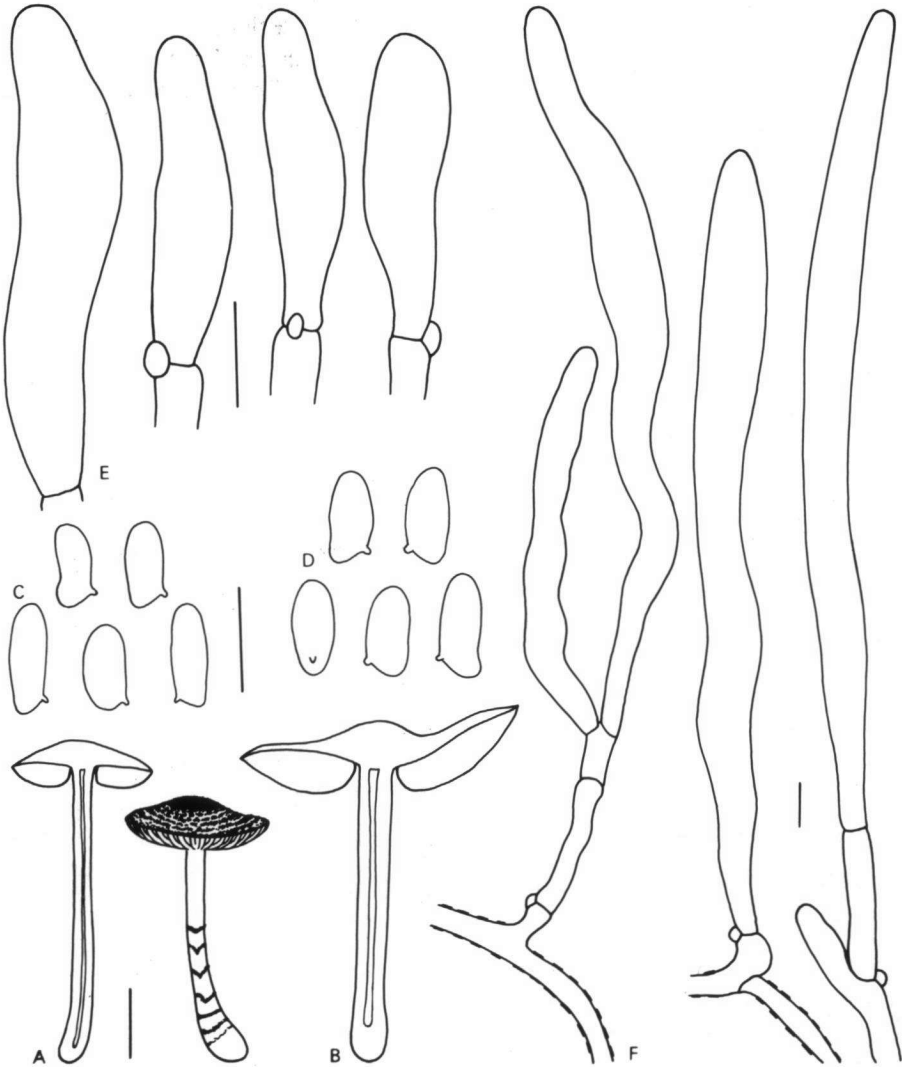


Fig. 4. *Lepiota griseovirens*. A, B. Basidiocarps; C, D. spores; E. cheilocystidia; F. elements of pileus covering. — A and C from Vellinga 1766, B, D–F from Vellinga 1700. — Scale bars as in Fig. 1.

ed near stipe, 2–4 mm broad, white to cream (10 YR 8/2), when young sometimes with greyish tinge, turning orange brownish or with orange-brown spots when old, with white finely flocculose edge. Stipe 20–60 × 2–5 mm, cylindrical and slightly broadened at base, fistulose, in upper half pale, whitish to greyish, lengthwise fibrillose, without real annulus, but especially when young with an annular zone, in the lower half covered with guirlandes or many scattered grey-black to grey-brown squamules as on pileus; background turning orange brownish at base; with white mycelium cords. Context in pileus white, with glassy line above lamellae, in stipe cortex pale yellow or brownish, at base of stipe turning orange-brown with age, inner part of stipe white cottony. Smell in young and undamaged specimens fruity, when damaged or with age more like *L. cristata*, lacking the rubber component, astringent. Taste rather strong, unpleasant, resembling smell. Spore print colour white.

Spores [420/26/17] in side view (6.1–)6.4–9.5(–10.8) × (3.0–)3.3–4.3(–4.6) μm, av. 1 × av. w = 7.0–9.0 × 3.5–4.1 μm, Q = 1.6–2.5(–2.7), av. Q = 1.8–2.4, oblong to cylindrical, with truncate base, the bigger the more distinctly spurred, in frontal view ± cylindrical, with thickened wall and patent hilar appendage, in Melzer's reagent dark red-brown, red in Congo red; wall in cresyl blue not colouring, slightly swelling in 10% NH₃(aq) plus 10% CH₃COOH(aq). Basidia 17–31 × 5.5–9.0 μm, 4-spored, often also 2-spored. Lamella edge sterile with tufts of cheilocystidia; cheilocystidia (16–)20–42(–50) × 5.0–10.5 μm, mostly narrowly utriform, also obovoid to narrowly clavate to nearly cylindrical. Pleurocystidia not observed. Pileus covering made up of tightly packed, erect rather straight elements, (55–)85–320(–400) × 6.5–20(–24) μm, cylindrical or fusiform, often with attenuate apex, rarely furcate, with greyish-brownish parietal and in basal hyphae incrusting pigment, also with some vague coloured granules in H₂O, sometimes in lower part with 1(–2) clampless septa. Stipitipellis a cutis of cylindrical, not coloured hyphae 2.5–8 μm in diameter; elements of squamules like those on pileus but slightly shorter 35–240 × 6.5–22 μm. Clamp-connections present in all tissues.

Habitat & distribution. Gregarious in small groups, terrestrial in deciduous forests on sandy to loamy soils rich in humus and nutrients; known in the Netherlands from several localities at the inner coastal dunes, the Fluviatiel and Haf district and from southern Limburg. In the Netherlands the most common species of the dark, greenish taxa. Rare in Europe. End of August to November.

Collections examined. NETHERLANDS: prov. Noord-Holland, Aerdenhout, Naaldenveld, 2.X.1975, *E. Kits van Waveren* (L); Amsterdam, Amsterdamse Bos, 25.IX.1990, *J. Reijnders* (coll. *C. Bas* 8749) (L); Heiloo, Heilooër Bos, 11.X.1975, *F.A. van de Bergh* (L); IJmuiden, Midden Heerenduin, 13.X.1990, *P.J. Keizer* 90032 (WAG-W); Vogelenzang, Bekslaand, 12.X.1966, *C. Bas* 4809 (L); Vogelenzang, Amsterdamse Waterleidingduinen, 1.XI.1984, *I. Wijtenburg* (coll. *Uljé* 50 & coll. *M.E. Noordeloos* 84394) (L); prov. Zuid-Holland, Ter Aar, de Put, 25.VIII.1985, *I. Wijtenburg* (coll. *Uljé* 578) (L); Wassenaar, Rust en Vreugd, 6.X.1990, *E.C. Vellinga* 1700 (L); Gelderland, Doorwerth, 23.IX.1972, *F. Tjallingii* (herb. Tjallingii); prov. Limburg, Cadier en Keer, Örenberg, 9.X.1991, *E.C. Vellinga* 1766 (L); Brunsum, mine Hendrik, 26.IX.1990, *H.A. Huijser* (L). — DENMARK: west Sjaelland, Bildsø Skov, 1.X.1961, *K. Bülow* (C). — GERMANY: Baden-Württemberg, Gottheim, 9.IX.1975, *M. Bon* 750948 (holotypus of *L. griseovirens* var. *obscura*) (Herb. M. Bon); Berlin-Spandau, Heerstraße/Scharfe Lanke, 8.X.1985, *E. Gerhardt* (L); Rheinland-Pfalz, Eifel, Daun, Mittleres Maar, 30.IX.1987, *E. Ludwig* (L). — SWITZERLAND: canton Bern, Aneth (Ins), Schwarzgraben, 14.X.1959, *H.S.C. Huijsman* (L). — CZECHOSLOVAKIA: Praha-Kinského zahrada, 16.IX.1954, *Wichansky* (holotypus of *L. grangei* f. *brunneoolivacea*) (PRM No. 189408).

Many authors list this species under the name *L. pseudofelina* J. Lange. Migliozi & Coccia (1990) have already pointed out that *L. pseudofelina* is a dubious taxon, an opinion shared by the present authors. The long spores (9.0–10.75 μm), the small size of the basidiocarps, the quick discolouration of the context (as young specimens show a reddish stipe), and the intracellular pigment in the elements of the pileus covering, as described and depicted by Lange (1935, 1938) set this taxon apart. Kühner (1936), however, considered the differences in spore size and the type of pigment as not important. It is possible that it represents a small basidiocarp of *L. grangei*. Original material is not present at C.

The description of *L. griseovirens* by Maire (1928) has been interpreted in several ways either in the same sense as presented here, or in the sense of *L. poliochloodes* (= *L. griseovirens* s.s. Reid). The code for the colour of the pileus is of great significance. Maire (1928) mentions for the pileus the code Klincksieck & Valette 174; this is the same as Séguéy 434, a dark greyish-greenish colour. This applies better to the species described here as *L. griseovirens* and not to the mostly paler coloured *L. poliochloodes*. The circumscription of the spore shape ('spora oblongae basi apophysatae, subtriangulares') does not apply to the shape of the spores of *L. poliochloodes*. Unfortunately, the elements of the pileus covering are not mentioned by Maire. However, the type material should be studied for a final decision about its identity. In spite of repeated requests no type material was sent from Algeria.

Several French authors regarded *L. griseovirens*, in contrast with *L. grangei*, as a dark species with non-intracellular pigment (Kühner, 1934; Romagnesi & Locquin, 1944), in the same sense as presented here. Candusso & Lanzoni (1990) and Kühner & Romagnesi (1953) presented *L. griseovirens* as well as *L. pseudofelina*, but without virtual differences mentioned.

Reid (1972) interpreted *L. griseovirens* as a species with short and broad spores and paler tinges of the mature basidiocarp and his interpretation is described here as *L. poliochloodes*. Another difference with *L. griseovirens* is found in the rather irregular pileus covering made up of moderately short elements.

Type material of *L. griseovirens* var. *obscura* M. Bon was studied. It was not in very good shape. The microscopical characteristics are as follows: spores [45/2/1] in side view (7.2–)7.6–8.8(–10.0) μm , av. $l \times \text{av. } w = 8.1\text{--}8.4 \times 3.8\text{--}3.9 \mu\text{m}$, $Q = 1.9\text{--}2.3\text{(}2.6\text{)}$, av. $Q = 2.1\text{--}2.2$, with rather inconspicuous spur; cheilocystidia present but difficult to observe, due to the state of preservation, 6.5–10 μm broad; elements of pileus covering more or less erect, 80–280 \times 10–20 μm , more or less cylindrical and narrowed into pedicel, with an occasional clampless septum in lower part; lower hyphae with incrustated pigment. This taxon does not represent *L. griseovirens* sensu Reid (and sensu Bon, 1981), on account of size and shape of the spores and size of the pilear elements, but it belongs to *L. griseovirens* in the present sense.

Type material of *L. grangei* f. *brunneoolivacea* Pilát was also studied. The microscopical characteristics are as follows: spores [30/2/1] in side view (6.4–)7.0–9.5(–10.4) \times 3.3–4.2(–4.8) μm , av. $l \times \text{av. } w = 8.0\text{--}8.1 \times 3.7\text{--}3.9 \mu\text{m}$, $Q = 1.8\text{--}2.45$, av. $Q = 2.0\text{--}2.2$, with rather inconspicuous spur; basidia 4- and also some 2-spored; cheilocystidia abundant, 24–40 \times 5–9 μm , elements of pileus covering more or less erect, cylindrical or slightly fusiform with rounded apex, 150–225(–320) \times 15–18 μm , some with 1 or 2 clampless septa. On account of the shape of the elements of the pileus covering this taxon clearly does not belong to *L. grangei*, but fits in *L. griseovirens*.

Lepiota grangei (Eyre) Kühner — Fig. 5

Schulzeria grangei Eyre in A.L. Sm. & Rea, Trans. Br. mycol. Soc. 2 (1903) 37. — *Hiatula grangei* (Eyre) W.G. Smith, Synopsis Brit. Basidiomyc. (1908) 27. — *Lepiota grangei* (Eyre) Kühner, Bull. mens. Soc. linn. Lyon 3 (1934) 79. — *Lepiotula grangei* (Eyre) Horak, N. Z. J. Bot. 18 (1980) 184.

Lepiota ochraceocyanea Kühner, Bull. mens. Soc. linn. Lyon 3 (1934) 43.

Misapplied name. *Lepiota forquignonii* sensu Barbier, Bull. mens. Soc. linn. Lyon 3 (1934) 76–78.

Excluded. *Lepiota grangei* sensu Van de Bergh, Coolia 23 (1980) 54–56 (= *L. griseovirens*).

Selected illustrations. Candusso & Lanzoni, Fungi eur. 4 (1990) pl. 21; Enderle, Z. Mykol. 51 (1985) between p. 16 and p. 17; J. Lange, Fl. agar. dan. 1 (1935) pl. 10A; Lanzoni, Boll. Gr. micol. G. Bresadola 29 (1986) 85; Locq., Bull. trimest. Soc. mycol. Fr. 60 (1944) pl. 2, fig. 3.

Selected descriptions & figures. Candusso & Lanzoni, Fungi eur. 4 (1990) 213–216; Enderle, Z. Mykol. 51 (1985) 19–22; Herink, Česká Mykol. 16 (1962) 228–234; Kelderman, Coolia 31 (1988) 91–92, fig. 2; Lanzoni, Boll. Gr. micol. G. Bresadola 29 (1986) 83–87, fig. 2; Locq., Bull. trimest. Soc. mycol. Fr. 60 (1944) 41–42.

Characteristics. Young pileus especially at centre with dark green-black or blue-black squamules, with context discolouring orange-brown with age; spores av. $l \times av. w = 8.9-11.2 \times 3.8-4.3 \mu\text{m}$, av. $Q = 2.2-2.9$; cheilocystidia $20-45 \times 5-13 \mu\text{m}$; elements of pileus with 0–3(–5) clampless septa, with parietal and intracellular pigment.

Pileus 13–40 mm, when young campanulate or hemispherical with inflexed margin, expanding to plano-convex with umbo, at centre green-black, dark grey-green, grey-blue or blue-green, then green-brown or blue-brown to brown, velvety-tomentose with small erect squamules, around centre with concolorous or slightly paler small to very small uplifted or erect squamules on pale cream to pale brown background, with age mostly discolouring orange-brown, more glabrous and squamules less conspicuous; margin irregular and with some velar remnants especially when young. Lamellae, $L = c. 30, l = 1-3$, moderately to rather crowded, free, ventricose or broadly ventricose, up to 6 mm broad, when young whitish to cream, when old with orange-brown spots, with white finely floccose edge. Stipe 25–60 \times 3–6 mm, cylindrical or slightly broadening downwards or with subbulbous base, fistulose with age, at apex glabrous and whitish or pale pinkish, lower down more orange (5 YR 5/8) or orange-brown, especially on handling, in lower half with some scattered girdles of squamules, as on pileus, blackish green-blue, blue-green or grey-green, without distinct annulus. Context in pileus white, in stipe concolorous with surface. Smell unpleasant, rubber-like, musty-stuffy or like *L. cristata*. Taste 'mild-aromatic'. Spore print colour white.

Spores [240/14/9] in side view $(7.3-8.0-13.0(-14.4) \times 3.4-4.6 (-5.0) \mu\text{m}$, av. $l \times av. w = 8.9-11.2 \times 3.8-4.3 \mu\text{m}$, $Q = 1.9-3.0(-3.2)$, av. $Q = 2.2-2.9$, with truncate to distinctly spurred base, in frontal view cylindrical or subcylindrical, not or uniguttulate, slightly thick-walled, with distinct patent hilar appendage, immediately orange-brown in Melzer's reagent, reddish pink in Congo red; wall not coloured in cresyl blue, swelling in 10% $\text{NH}_3(\text{aq})$ plus 10% $\text{CH}_3\text{COOH}(\text{aq})$. Basidia $(20-22-35 \times 6.5-11.5 \mu\text{m}$, 4-spored, rarely some 2-spored. Lamella edge sterile, made up of cheilocystidia, $(16-20-45(-55) \times 5-13(-15) \mu\text{m}$, \pm cylindrical, narrowly utriform or narrowly clavate, colourless, often on broad basal element or septate in lower part. Pleurocystidia not observed. Pileus covering made up of more or less erect elements, $(30-50-300(-400) \times (6.5-8-20(-24) \mu\text{m}$, cylindrical with rounded apex, attenuate towards base, mostly septate, with 0–3(–5) clampless septa, with thickened walls and with basal clamp-connection; pigment brownish

parietal and intracellular, when fresh blue-green intracellular, in dried material in granules, visible in H₂O. Stipitipellis a cutis of narrow 2–7 µm wide cylindrical colourless hyphae; elements of squamules and girdles as those on pileus but less septate, 35–310 × 8–21 µm. Clamp-connections present in all tissues.

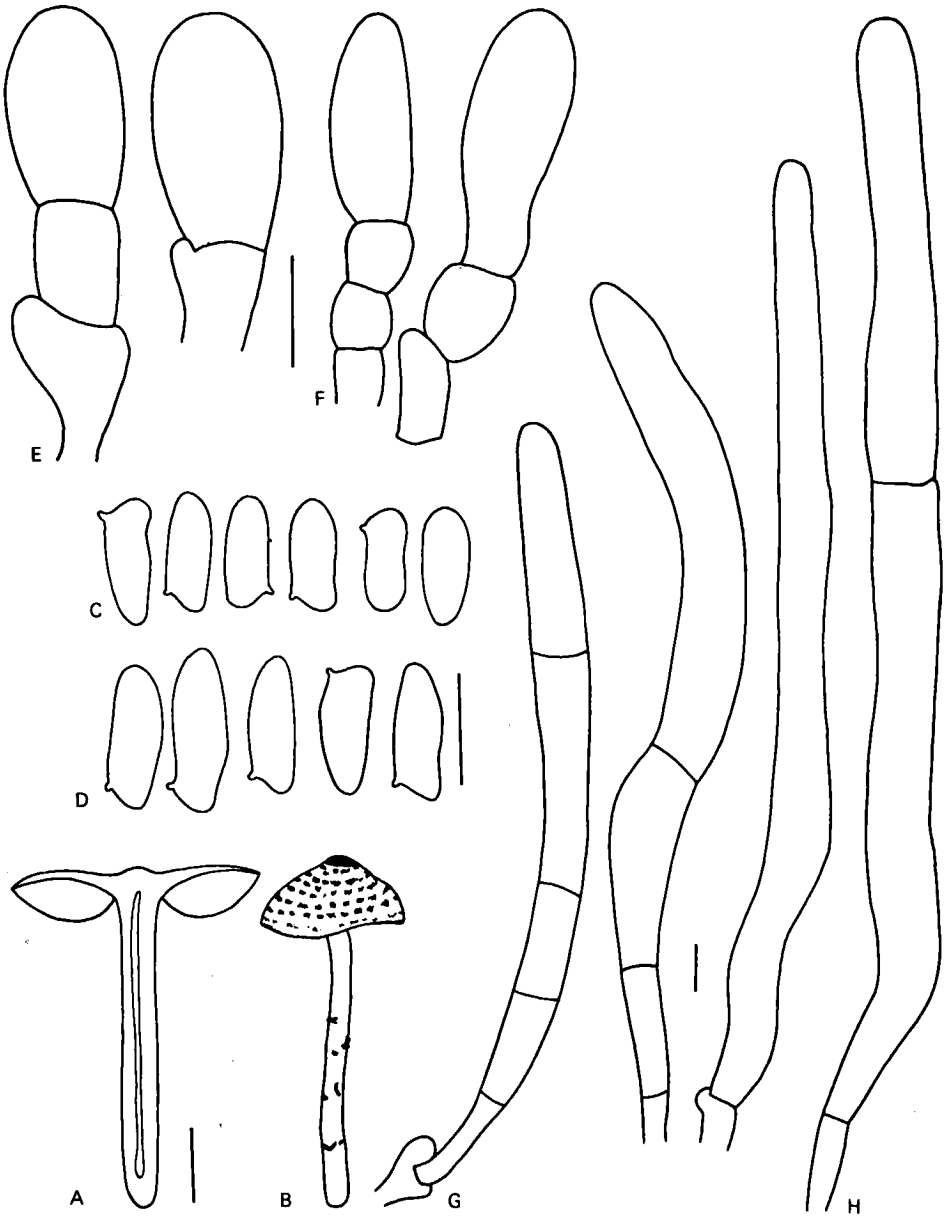


Fig. 5. *Lepiota grangei*. A, B. Basidiocarps; C, D. spores; E, F. cheilocystidia; G, H. elements of pileus covering. — A, C, E, and G from Kelderman 873, B, D, F, and H from Vellinga 1015. — Scale bars as in Fig. 1.

Habitat & distribution. Gregarious, in small groups, terrestrial in deciduous woods, especially in *Fagus* woods on \pm calcareous, loamy or sandy and humous soils, but also on mine waste heaps under *Salix* and *Betula*. In the Netherlands very rare ('s-Graveland; Cadier en Keer, Riesenberg; Kerkrade, mine Laura-Julia; Valkenburg, Schaelsberg); more common in south-eastern Belgium, western Germany (Eifel) etc. Known from Eurasia, Argentina and New Zealand. End of September and October.

Collections examined. NETHERLANDS: prov. Noord-Holland, 's-Graveland, 23.IX.1955, *J. Daams* (L); prov. Limburg, Kerkrade, mine Laura-Julia, 26–28.IX.1980, *P.H. Kelderman* 873 (L), 24.X.1990, *H.A. Huijser* (L) and 26.X.1991, *H.A. Huijser* (L); Cadier en Keer, Riesenberg, 30.IX.1989, *H.A. Huijser* (L); Valkenburg, Schaelsberg, 26.X.1991, *H.A. Huijser* (L). — BELGIUM: prov. Namur, Matagne la Grande, Les Mires, 21.IX.1986, *E.C. Vellinga* 1015 (L). — GERMANY: Rheinland-Pfalz, Eifel, Gerolstein, Heiligenstein, 25.IX.1980, *C.M. den Held-Jager* (L); Meerbusch, Dreimüllerwald, 28.IX.1987, *E.C. Vellinga* 1193 (L).

This species shows a wide variation in colour of the pileus, i.e., blue-green to more brown-green tinges can dominate. Possibly these differences are due to atmospheric conditions, as the pigment in the pileus covering is intracellular and soluble in H₂O. Spore size is highly variable within one collection and between separate collections, even from the same locality, and such a wide range of spore size in this species group is only found in this species. Elements of the pileus covering of small specimens have in average less septa than those of big basidiocarps.

II. *Lepiota fulvella* and *L. boudieri*

Lepiota boudieri Bres. — Fig. 6

Lepiota boudieri Bres., *Fungi trident.* 1 (1884) 43, non *L. boudieri* Gueguen, *Bull. trimest. Soc. mycol. Fr.* 24 (1908) 127.

Lepiota fulvella Rea, *Trans. Br. mycol. Soc.* 6 (1917) 61.

Lepiota fulvella f. *gracilis* J. Lange, *Fl. agar. dan.* 1 (1935) 32 (not valid, without Latin diagn.).

Misapplied name. *Lepiota castanea* sensu Pilát, *Acta Mus. nat. Prag.* 11B (1955) 3–5.

Excluded. *Lepiota fulvella* sensu M. Bon, *Docum. mycol.* 11 (43) (1981) 35–36 (= ?*L. castanea*).

Selected illustrations. Krieglsteiner, *Z. Mykol.* 51 (1985) opposite p. 132; Kühner, *Bull. trimest. Soc. mycol. Fr.* 53 (1937) Atlas pl. 74 I; J. Lange, *Fl. agar. dan.* 1 (1935) pl. 12D, 12F; R. Phillips, *Paddest. Schimm.* (1981) 29 (all as *L. fulvella*).

Selected descriptions & figures. Babos, *Annl. hist.-nat. Mus. natn. Hung.* 66 (1974) 69 (as *L. fulvella*); Bres., *Fungi trident.* 1 (1884) pl. 46; Kelderman, *Coolia* 31 (1988) 39–41, fig. 1; Krieglsteiner, *Z. Mykol.* 51 (1985) 108–109 (as *L. fulvella*); Kühner, *Bull. trimest. Soc. mycol. Fr.* 52 (1936) 234–236 (as *L. fulvella*); J. Lange, *Dansk bot. Ark.* 4 (4) (1923) 48.

Characteristics. Pileus 20–65 mm, orange-brown to dark red-brown at centre and paler towards margin, fading with age to more ochraceous tinges, completely covered with radial fibrillose squamules, not or scarcely showing the underlying context; lamellae crowded, free, white to pale cream, often red-spotted with age, with concolorous flocculose edge; stipe 30–70 \times 3–8 mm, at apex whitish to pinkish, when young with white flocculose annular zone, below annulus with adnate orange-brown fibrillose squamules; smell fungoid-terroid to sweetish, fruity etc.

Spores in side view 7.0–10.0(–11.0) \times 3.0–4.0(–4.5) μ m, Q = (1.9–)2.1–2.9(–3.1), av. Q = 2.2–2.7, with truncate to spurred base; basidia mostly 4-spored; lamella edge

sterile; cheilocystidia $13\text{--}38 \times 5\text{--}12 \mu\text{m}$, subtriform, clavate to ovoid, often articulate; pileus covering made up of adnate to uplifted bundles of hyphae, with elements articulate and clamped at septae, with brown intracellular pigment, dissolving in $\text{NH}_3(\text{aq})$; terminal elements $40\text{--}215 \times 8\text{--}24 \mu\text{m}$, more or less cylindrical or tapering towards apex, with rounded apex.

This taxon is rather variable in colour; in typical variants it is rather orange-brown tinged, but also dark, more purple-tinged basidiocarps and even basidiocarps without pigments can be found. The colour of the pileus changes from orange-brown to more ochraceous brown with age, and the lamellae occasionally have reddish spots or even a reddish or purplish tinged edge with age.

This species, microscopically characterized by a pileus covering made up of articulate elements with intracellular pigment, is known in literature either as *L. fulvella* Rea (e.g. Moser, 1984; Krieglsteiner, 1985) or as *L. boudieri* Bres. (e.g. Bon, 1981; Candusso & Lanzoni, 1990). Bon (1981) misinterprets *L. fulvella* as a species with non-articulate elements on the pileus (with intracellular pigment).

Original material of *L. boudieri*, present in S, collected by Bresadola in 1888, 'In silva tertiolasii' (i.e. in Valle di Sole, the type locality), is old and rather brittle, but nevertheless the important characteristics could be observed.

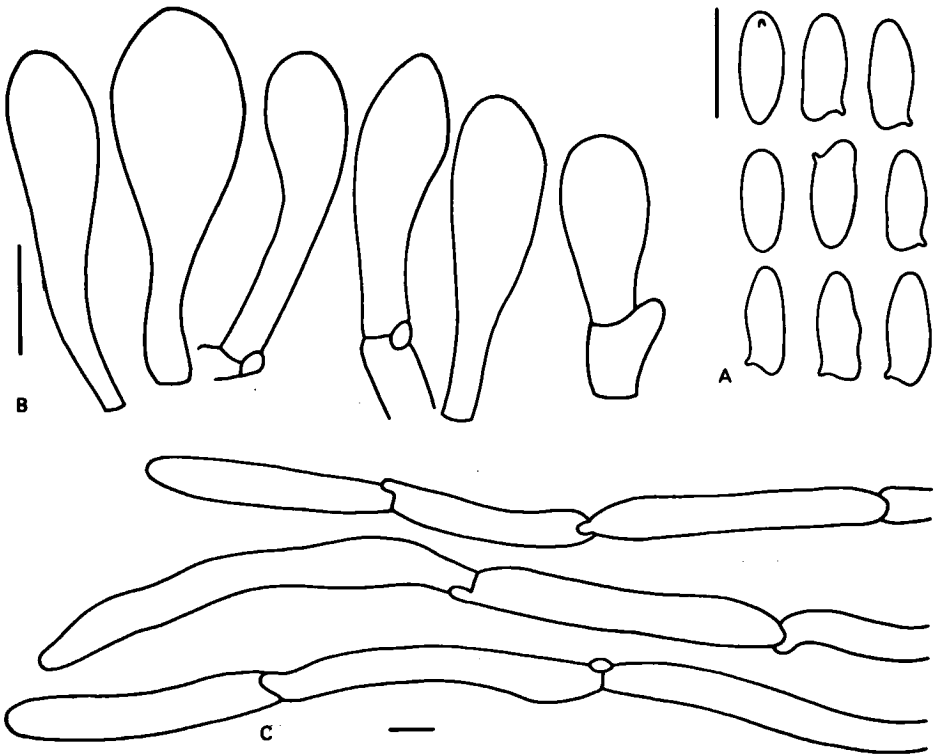


Fig. 6. *Lepiota boudieri*. a. Spores; b. cheilocystidia; c. elements of pileus covering. — All from Bresadola, 1888. — Scale bar = $10 \mu\text{m}$.

Spores [61/2/1] in side view (7.2–)7.8–10.0(–10.6) × (3.2–)3.4–4.2(–4.5) μm, av. l × av. w = 8.6–8.9 × 3.6–3.8 μm, Q = (1.9–)2.0–2.65, av. Q = 2.25–2.45, with or without conspicuous spur; cheilocystidia difficult to observe, 20–35 × 5.5–10(–12) μm, narrowly clavate to clavate, some more fusiform, some articulate; hyphae on the pileus articulate, consisting of cylindrical to slightly inflated elements, 55–90 × 8–12 μm, with clamp-connections.

The original plate of *L. boudieri* (Bresadola, 1884) shows a rather pale coloured fungus with radiating fibrillose covering on pileus with a purplish tinged lamella edge, representing a rather old and faded specimen. On account of the colour of the lamella edge Kühner (1936) decided to call his finds *L. fulvella*, as he had typical material, and not old specimens.

The type material of *L. fulvella* has been lost, but a water-colour of the original material is preserved at the Herbarium at Kew. This water-colour shows an orange-brown *Lepiota* with a more or less fibrillose covering, without doubt identical with the present interpretation of the species. Spore sizes as given by Rea (1917) also agree with the modern interpretations.

The conclusion of these studies is that *L. boudieri* and *L. fulvella* are synonyms.

Material in Bon's herbarium identified as *L. acerina* Peck actually represents also this species; this exsiccate (leg. W. Winterhoff 86360, 9.IX.1986, Germany, Oberrhein-ebene) has the following characteristics: spores [15/1/1] 8.8–9.6(–10.0) × 3.2–4.0 μm, av. l × av. w = 9.25 × 3.5 μm, Q = 2.5–2.85, avQ = 2.65; lamella edge sterile; elements of pileus covering articulate with intracellular pigment, soluble in NH₃(aq).

ACKNOWLEDGEMENTS

Many mycologists kindly put collections of fresh or dried specimens to our disposal. Our gratitude extends to the curators of the herbaria at Copenhagen, Kew, Praha (PRM), and Stockholm and Mr. M. Bon for sending collections on loan. Several people were so kind as to give help with foreign languages as Czech and Latin. Thanks are also due to Thomas W. Kuyper for his critical comments on the manuscript of this paper.

REFERENCES

- Bon, M. 1981. Clé monographique des "Lépiotes" d'Europe. *Docum. mycol.* 11 (43): 1–77.
 Bresadola, G. 1881–1887. *Fungi tridentini* 1. Tridenti.
 Candusso, M. & G. Lanzoni. 1990. *Lepiota* s.l. *Fungi europaei* 4. Saronno.
 Krieglsteiner, G. J. 1985. Über neue, seltene, kritische Makromyzetten in der Bundesrepublik Deutschland (Mitteleuropa) VI. *Z. Mykol.* 51: 85–130.
 Kühner, R. 1934. A propos des 'Lepiota griseovirens' R. Maire et 'cretini' Bataille. *Bull. mens. Soc. linn. Lyon* 3: 41–43.
 Kühner, R. 1936. Recherches sur le genre *Lepiota*. *Bull. trimest. Soc. mycol. Fr.* 52: 175–238.
 Kühner, R. & H. Romagnesi. 1953. *Flore analytique des champignons supérieurs*. Paris.
 Lange, J.E. 1923. Studies in the Agarics of Denmark V. *Dansk bot. Ark.* 4 (4).
 Lange, J.E. 1935. *Flora agaricina danica* 1. Copenhagen.
 Lange, J.E. 1938. Studies in the Agarics of Denmark XII. *Dansk bot. Ark.* 9 (6).
 Locquin, M. 1945. Notes sur les Lépiotes (II). *Bull. mens. Soc. linn. Lyon* 14: 44–63, 82–100.
 Maire, R. 1928. Diagnoses de champignons inédits de l'Afrique du Nord. *Bull. trimest. Soc. mycol. Fr.* 44: 37–56.

- Migliozzi, V. & M. Coccia. 1990. Un problema irrisolto: *Lepiota pseudofelina* e descrizione di *Lepiota pseudofelina* Lange ss. auct., non Lange. Boll. Ass. micol. ecol. rom. 7 (19): 17–23.
- Moser, M. 1984. Die Röhrlinge und Blätterpilze. 5. Aufl. In: H. Gams, Kleine Kryptogamenflora Band Iib/2. Stuttgart/New York.
- Rea, C. C. 1917. New or rare British fungi. Trans. Br. mycol. Soc. 6: 61–64.
- Reid, D. A. 1972. Fungorum rariorum icones coloratae. Pars VI.
- Romagnesi H. & M. Locquin. 1944. Notes sur quelques espèces rares de *Lepiota*. Bull. trimest. Soc. mycol. Fr. 60: 52–59.