Mycol. Res. **94** (6): 781–788 (1990) *Printed in Great Britain*

More agarics from xerophytic grasslands in central Spain

G. MORENO, F. ESTEVE-RAVENTÓS, C. ILLANA AND M. HEYKOOP

Department of Plant Biology (Botany), Alcalá de Henares University, Madrid, Spain

More agarics from xerophytic grasslands in central Spain. *Mycological Research* **94** (6): 781–788 (1990).

Agaricus goossensiae var. *pseudolutosus* var. nov., *Conocybe cylindracea*, *Coprinus megaspermus*, *C. ovatus*, *C. vosoustii*, *Lepiota locquinii* f. *rioussetiae*, *Leucoagaricus macrorrhizus*, *Mycena chlorantha*, *M. olivaceomarginata* and *M. pseudopicta* are reported from xerophytic grasslands in central Spain.

Key words: Agaricales, *Agaricus*, *Conocybe*, *Coprinus*, *Lepiota*, *Leucoagaricus*, *Mycena*, Systematics, Ecology, Xerophytic grasslands, Spain.

The fungi from xerophytic grasslands of the Iberian Peninsula have not been the subject of detailed study, probably due to the inconstancy of fruiting. This contribution follows an earlier account by Moreno & Esteve-Raventós (1988).

Agaricus goossensiae Heinem. var. **pseudolutosus** Moreno *et al.*, var. nov. (Figs 1–7)

Etym.: Resembling *A. lutosus* according to the illustrations of Cappelli (1984)

A typo differt cystidiis nullis.
Holotypus H.AH 11488.

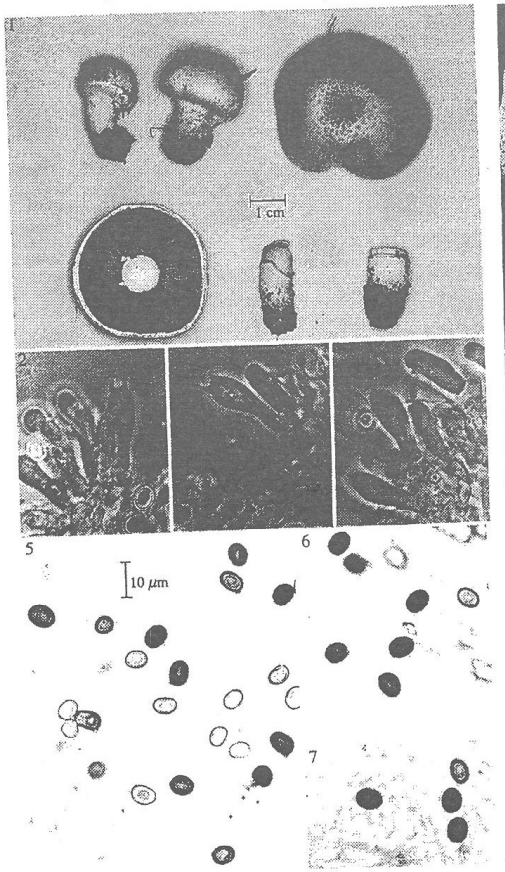
Pileus 2·5–5 (–6·5) cm diam, hemispherical to convex, finally plano-convex, whitish to whitish-ochre, turning more or less deep yellow with age or when touched, smooth at first, then with concentric purplish squamules at the centre; margin incurved to straight, slightly floccose when young. *Lamellae* free, crowded, grey-pinkish to pink when young, purple-greyish when old, without a white edge. *Stipe* 2–4 × 0·4–0·7 cm, cylindrical, never bulbous, sometimes curved, not tapering at the base, whitish, discolouring more or less yellow when old or touched, specially at the base where it is slightly floccose; *ring* pendant, simple, more or less membranous, whitish, sometimes with brownish tints at the margin. *Context* whitish, turning slightly pinkish; *odour* fungoid, slightly of almonds; *taste* pleasant, sweetish. *Schaeffer's reaction* positive, even in dry specimens. *Spores* 6–7·5 × 4·5–5·5 (–6) µm, ovate, brown-purplish, smooth, thick-walled, without germ-pore. *Basidia* 25–30 × 7–9 µm, 4-spored, clavate. *Lamella-edge* fertile, with basidia and basidioles. *Cystidia* not observed. *Pileipellis* a cutis formed by elongated hyphae < 9 µm diam. *Clamp-connexions* present.

Specimens examined: Among Poaceae, in uncultivated, basic lands, near Alcalá de Henares University, Madrid, 22 Oct. 1987, G. Moreno & F. Esteve-Raventós 10384; *ibid.*, 10 Nov. 1988, V. Carnero, J. A. Esteban, A. Altés & G. Moreno 11488 (Holotype); *ibid.*, 14 Nov. 1988, J. Alvarez, G. Moreno, A. Acha & M. Heykoop 11589; among Poaceae in acid soil, Arroyo del Barbaón, Natural Parc of Monfragüe, Cáceres, 3 Nov. 1987, G. Moreno, F. Esteve-Raventós & C. Illana 11582; among Poaceae in acid soil, Polideportivo de la Elipa, Madrid, 11 Nov. 1987, E. López 10487.

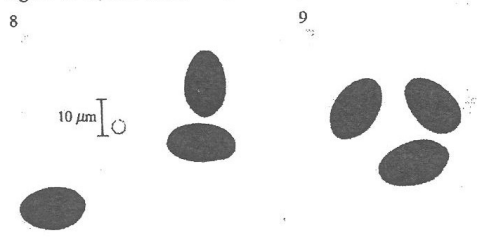
Agaricus goossensiae var. *pseudolutosus* is a member of Section *Minores* Fr., characterized by its small to medium size basidiome yellowing markedly, and with cap normally developing small purplish scales. The whole basidiome turns more or less yellow to orange-yellow with age or when touched, except the lamellae. Microscopically, the large spores and absence of true cheilocystidia are typical, and Schaeffer's reaction is positive which rules out the possibility of considering it among some yellowing taxa in the *A. campester* group. *Agaricus lutosus* Möller is very close to *A. goossensiae* var. *pseudolutosus* in its macroscopic characters, as can be observed in Capelli (1984), but this has smaller spores (4–5 × 3–3·5 µm), typical clavate cheilocystidia and tapering stipe. Owing to the absence of cheilocystidia, *A. goossensiae* var. *pseudolutosus* is closely related to *A. comtulus* Fr., but the latter has a completely white cap, never showing purplish colours, smaller spores (4·5–5·5 × 3–3·5 µm), and hardly turns yellow with age or with friction. On the other hand, *A. rusiophyllus* Lasch, as conceived today, is a species with bulbous stipe, not turning so intensely yellow, as can be deduced in Capelli (1984) and the compilation by Bon (1985); furthermore, its spores are smaller (5·5 (–6) × 4 µm).

Agaricus goossensiae was proposed as a new species by Heineman (1956) from material collected in Zaire, but it is closest to the Spanish collections. It shares the same dimensions and colours of the basidiomes and spores, differing in the

Figs 1–7. *Agaricus goossensiae* var. *pseudolutosus*, 11488. **Fig. 1.** Basidiomes. **Figs 2–3.** Basidia. **Fig. 4.** Basidioles. **Figs 5–7.** Spores.

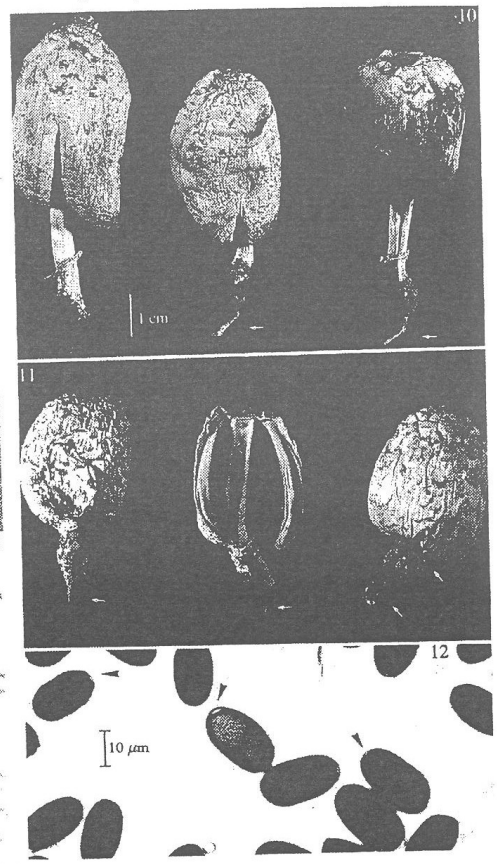


Figs 8–9. *Coprinus megaspermus*, 11583, spores.



presence of cheilocystidia and the yellow pigmented lamella-edge. The African taxon was first described from dry material collected by Mme Goossens-Fontana in 1931. Heinemann (1956) points out that: 'la description est basée sur la planche et sur l'exsiccatum, l'état de ce dernier ne permet pas une étude

Figs 10–12. *Coprinus ovatus*, 11654, 11653. **Figs 10–11.** Basidiomes; 11653. **Fig. 12.** Spores.

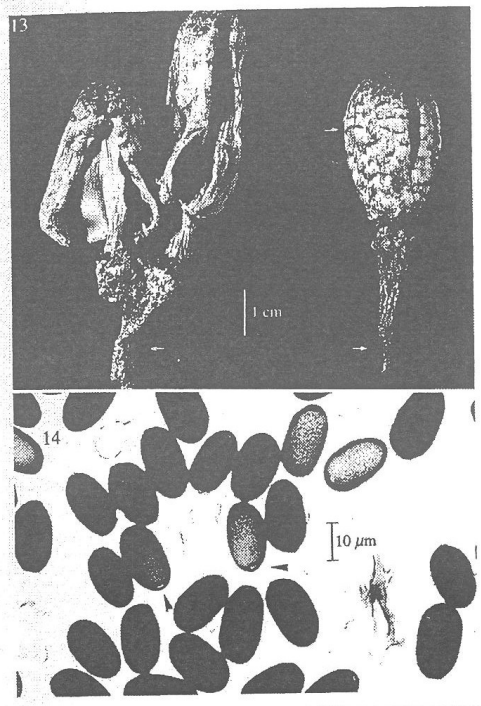


suffisante de l'hymenium'. On the other hand, one can deduce that this may be an abundant species in Zaire: 'comestible et de saveur délicieuse, consommé par les populations Budjala et par les blancs'. The Spanish material could have been described as a new species, based on the microscopic characters, but it would be convenient to make further studies of this species in Africa to check the constancy of these differences.

Conocybe cylindracea Maire & Kühner ex Kühner & Watl., *Notes Roy. Bot. Gard. Edinb.* **40**: 541 (1983).

This interesting *Conocybe* species is well characterized by its conico-ellipsoidal to cylindrical pileus; the stipe covered by hyaline hairs, devoid of lecythiform cystidia, ellipsoid spores with a conspicuous germ-pore and preference for mediterranean localities. It was originally described from Argelia (Kühner, 1935; Malençon & Bertault, 1970), and validated by Watling (1983); it was previously recorded in Spain by Moreno (1978).

Figs 13–14. *Coprinus ovatus*, 11652. **Fig. 13.** Basidiomes; 11653. **Fig. 14.** Spores.



Specimens examined: Among grass in an open and nitrogenous *Quercus suber* forest, in acid soil, Crtra, de La Bazagona a Las Cansinas, Natural Parc of Monfragüe, Cáceres, 29 Oct. 1987, F. Esteve-Raventós & G. Moreno 10807; among Poaceae in grassland, in basic soil, Alcalá de Henares University, Madrid, 10 Nov. 1988, A. Altés, J. Esteban & G. Moreno 11581.

Coprinus megaspermus P. D. Orton, *Notes Roy. Bot. Gard. Edinb.* **32**: 141 (1978). (Figs 8–9)

Our only collection agrees with the description of Orton & Watling (1979), and more recently, that of Uljé & Bas (1988). It shows the following main characters: pileus < 3 cm diam, stipe < 7 cm long, lamellae forming the typical '*C. plicatilis collarium*', spores 15–19 × 8·5–11 µm, smooth, ellipsoid, very dark (nearly black), with an apical and central germ-pore, sometimes slightly lateral towards the abaxial face and cylindrical to lageniform marginal and facial cystidia.

Specimens examined: Among grass in an open *Pinus sylvestris* forest, in basic soil, Lagunillos, El Hosquillo, Cuenca, 7 May 1988, Gl. Moreno & G. Moreno 11583.

Coprinus ovatus (Schaeff.: Fr.) Fr., *Epicr.*: 242 (1838). (Figs 10–14)

Agaricus ovatus Schaeff., *Fung. Bav.* tab. 7 (1762).
Agaricus ovatus Schaeff.: Fr., *Syst. mycol.* **1**: 388 (1821).
Coprinus comatus (Müll.: Fr.) S. F. Gray var. ? Malençon & Bertault, *Fl. Champ. Sup. Maroc* **1**: 226–227 (1970).

Our material essentially agrees well with the description of Malençon & Bertault (1970); we have observed the following characters in our specimens; pileus reaching 5·5 × 4·5 cm; stipe always rooting markedly with a big mycelial cord (< 4 cm long); spores (13–) 13·5–19 × 8–11 µm, dark-brownish to purplish, with a central, apical germ-pore, sometimes slightly eccentric to its abaxial face; cheilocystidia globose, making the edge sterile; pleurocystidia not seen; clamp-connexions present.

Coprinus ovatus is different from the other species of Section *Coprinus* stirps *comatus* (Orton & Watling, 1979) by its rooting stipe and large spores with apical and central to slightly eccentric germ-pore. *Coprinus comatus* shares the scaly pileus and the lamellae turning pink before blackening but differs by its sporal range (10–15 × 6·5–8 µm), never markedly rooting stipe, and more or less caespitose habit. *Coprinus comatus* forma *sphaerocephalus* J. Lange (Lange, 1939, pl. 156 fig. D), shows a thick brownish veil, small habit (cap originally almost globose, 5–6 cm) and nitrogenous habitat (collected in a park). His taxon might certainly be close to *C. vosoustii* Pilát; Lange's plate fits the macroscopic characters although he does not indicate the stellate disruption of the thick veil and spore morphology; we think that it should be considered a doubtful taxon. *Coprinus sterquilinus* (Fr.) Fr., is a fimicolous species with large spores, (16–) 17–22 × 10–13 (–13·5) µm (Orton & Watling, 1979), and shares similar habit and rooting stipe as *C. ovatus*. *Coprinus oblectus* (Bolt.) Fr., according to Fries' description, based on an illustration of Bolton, is a difficult taxon to interpret; it might be either *C. vosoustii*, *C. ovatus* or a form of *C. comatus*.

The only remarkable difference, pointed out in Fries' text, with our collected specimens would be that referred to the colour of the lamellae. *C. ovatus sensu* Fr. has white lamellae turning directly blackish at maturity without intermediate reddish or purplish colours. Schaeffer's plate no. 7 displays *C. ovatus* characters very well, closely resembling our material. According to our observations, *C. ovatus* is a species with mediterranean ecological preferences, found in xerophytic grasslands as well as in *Quercus* (*Q. ilex*, *Q. rotundifolia* and *Q. suber*) forests: this chorological data agrees with the remarks of Malençon & Bertault (1970).

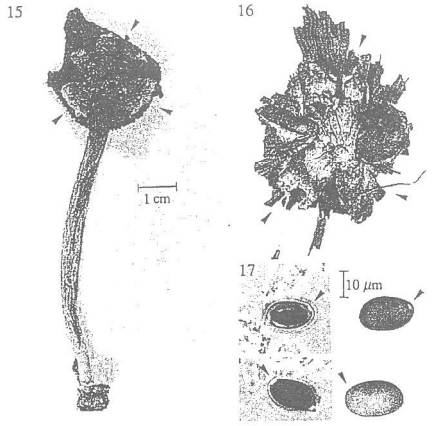
Specimens examined: In humus of *Quercus rotundifolia*, in acid soil, El Pardo, Madrid, 11 Oct. 1986, F. Esteve-Raventós & G. Moreno 11652; in humus of *Quercus suber*, in acid soil, Exposición de Zafra, Badajoz, 23 April 1989, C. Sendín 11654; in xerophytic grasslands, in basic soil, Alcalá de Henares University, Madrid, 15 Nov. 1988, J. Alvarez, A. Acha, M. Heykoop & G. Moreno 11653, 11655.

Coprinus vosoustii Pilát, *Stud. Bot. Cech.* **5**: 207 (1942). (Figs 15–17)

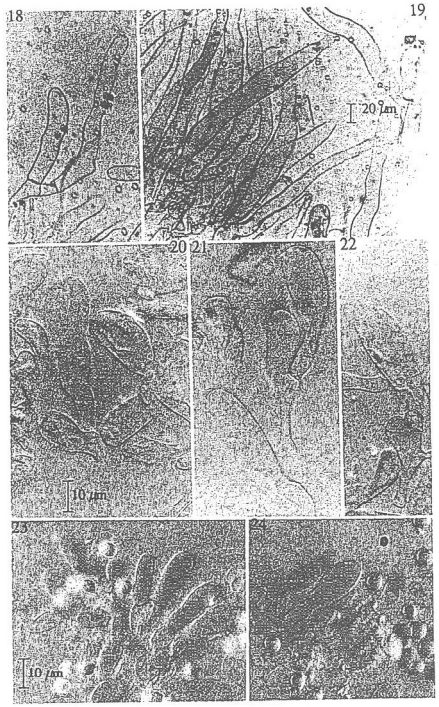
Our collections macro- and microscopically agree very well with that of Donelli & Simonini (1989). *Coprinus vosoustii* is characterized by its ovate pileus smaller than in *C. comatus*; its typical brownish-ochre veil, thick, and persisting in a star-shaped way after deliquescence; the bulbous, somewhat rooting stipe; and ellipsoid spores with eccentric germ-pore on the abaxial face. It seems to be a vernal species according to Donelli & Simonini (1989).

In Moreno (1976), this taxon was described as *C. sterquilinus*

Figs 15–17. *Coprinus vosoustii*, 1284. **Figs 15–16.** Basidiomes; 556. **Fig. 17.** Spores.



Figs 18–24. *Lepiota locquinii* f. *rioussetiae*, 10466. **Figs 18–19.** Epicutis; 10070. **Figs 20–24.** Epicutis, cheilocystidia.



var. *dorsiporus* var. nov., with the following characters: pileus 3–5 cm high, ovoid at first, then flat, with fibrous and furrowed margin, retaining a characteristic thick, brownish veil at the centre, which is not or hardly deliquescent. Stipe < 13 × 0·3–0·5 cm, white, cylindrical, hollow, fragile, somewhat bulbous and slightly rooting. Gills free, ascendant, deliquescent, white at first, turning pink, then blackish at maturity. *Veil* formed by filamentous hyphae. *Spores* 17–23 × 10–14 µm, ellipsoid, smooth, brown-blackish, with a lateral, typically dorsal germ-pore at the abaxial face. *Basidia* 4-spored, clavate. *Cheilocystidia* globose to ellipsoid. *Pleurocystidia* not seen. Clamp-connexions present.

Specimens examined: In nitrogenous gardens, in acid soil, Facultad de Farmacia y Medicina, Madrid, 13 May 1976, K. Tabba 556; *ibid.*, 19 May 1976, 8 May 1977 and 1 Oct. 1977, G. Moreno 1218, 1284, 11584.

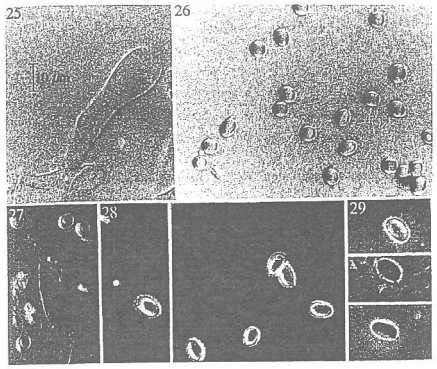
Lepiota locquinii Bon forma **rioussetiae** Bon, *Doc. Mycol.* **61**: 46 (1985). (Figs 18–29)

A small taxon, described by Bon (1985 *b*) and characterized by the lilac-pinkish tints on the stipe, and a trichodermium of variable hair-length. Our abundant collections, recorded for the first time in Spain and, for the second time, in Europe, show the following characteristics: *pileus* 0·6–2 cm diam, convex to plano-convex, uniformly argillaceous to brownish-ochre; epicutis breaking in very small squamules on a whitish ground, being strigose-floccose at the centre, which is concolorous or darker than the rest. *Lamellae* free, ventricose, whitish, with concolorous, floccose edge. *Stipe* 1–3 × 0·1–0·3 cm, cylindrical, sometimes slightly enlarged at the base, not bulbous, whitish to argillaceous in its basal portion, with lilac to pinkish patent tints; ring white, located at the upper half of the stipe, very fugacious at maturity. *Context* whitish. *Odour* and *taste* absent or weak. *Spores* 6–9 × 4·5–5·5 µm, amygdaliform to broadly ellipsoid, more rarely subglobose, hyaline, smooth, dextrinoid, thin-walled, without germ-pore. *Basidia* 20–34 × 6–10 µm, 4-spored, more rarely 2-spored. *Cheilocystidia* very variable, clavate, cylindrical or fusiform, (15–) 18–25 × 6–8 µm. *Subhymenium* formed by catenulate, variable hyphae. *Pileipellis* a trichodermium of clavate to cylindrical hairs, 30–160 (–220) × 10–15 (–20) µm, variable in length. Clamp-connexions present.

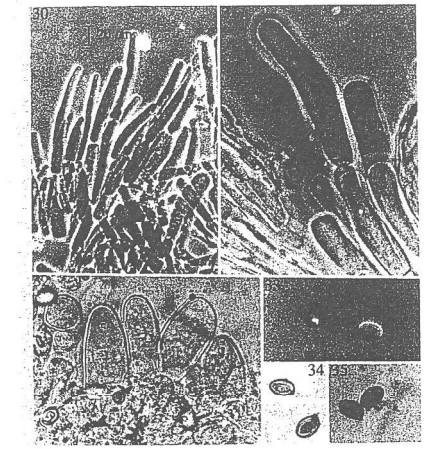
The pileal epicutis breaking at the centre in small strigose squamules, the ring present at first, the lilac to pinkish tints at the stipe and the epicutis formed by variable hairs are characteristic. The study of the holotype has revealed these macro- and microscopical similarities, though the spores of the type are smaller (5·3–6 × 3–4 µm) yet morphologically similar. Spore variability has been frequently observed by us in the abundant material collected and examined; for instance, collections 10070 and 10071 show spores broadly ellipsoid to subglobose, 5–6 (–6·5) × 4–5 µm, although all other characters are in agreement.

Specimens examined: Among Poaceae (mainly *Dactylis glomerata* ssp. *hispanica*), in basic soil, Alcalá de Henares University, Madrid, 26 Oct. 1987, F. Esteve-Raventós, G. Moreno, C. Illana & M. Heykoop 10469; in xerophytic grasslands under *Salsola vermiculata*, in basic soil, Finca de La Oruga, Alcalá de Henares, Madrid, 21 Nov. 1987, G. Moreno, F. Esteve-Raventós, C. Illana & M. Heykoop 10470,

Figs 25–29. *Lepiota locquinii* f. *rioussetiae*, 10070. **Figs 25–27.** Epicutis, spores, basidium; 10466. **Fig. 28.** Spores; holotype Bon 77102002. **Fig. 29.** Spores.



Figs 30–35. *Leucoagaricus macrorrhizus*, 11622. **Figs 30–34.** Epicutis, cheilocystidia, spores; Bon 70307. **Fig. 35.** Spores.



10471, 10472 and 10473; same ecology and locality, 26 Oct. 1987, G. Moreno, F. Esteve-Raventós, C. Illana & M. Heykoop 10070, 10071; among Poaceae (mainly *Dactylis glomerata* spp. *hispanica*), in basic soil, Alcalá de Henares University, Madrid, 21 Nov. 1987, G. Moreno & F. Esteve-Raventós 10474.

Leucoagaricus macrorrhizus Locquin ex Horak, *Beitr. Kryptogamenfl. Schweiz* **13**: 344 (1968). (Figs 30–35)

Leucocoprinus macrorrhizus Locquin, *Bull. Mens. Soc. Linn. Lyon* **12**: 75 (1943).

Lepiota macrorrhiza (Locquin) Kühner & Romagn., *Fl. Anal. Champ. Supér.*: 406 (1953).

Though there are some discrepancies in the descriptions, our material agrees well with most of them. Bon (1981, 1987) indicates and figures spores with a conspicuous germ-pore, but a study of material from his herbarium has revealed a small, hardly visible or absent germ-pore, very similar to those of our collection. It is an easily recognizable taxon, on the basis of its macroscopic characters: a more or less rooting stipe which turns brownish or red-brownish when touched or spontaneously when old, lamellae forming a 'collarium' near the stipe and a white-greyish to grey-ochre pileus with radially arranged fibres near the margin. However, we think that some characters can be very variable, such as the rooting stipe and the browning or reddening of the basidiomes. Wasser (1979) describes collections with rooting stipes, while Alessio (1988) indicates a hardly rooting stipe for the variety *pinguipes*. There are also some discrepancies about the presence of pleurocystidia, already indicated in Locquin's original description; they are present in our material, and Bon (1981) indicates the possibility of their presence, but nothing is said by Wasser (1979) or Donelli & Simonini (1984).

Considered by Singer (1986) as the type species of this genus, *L. macrorrhizus* seem to show a certain preference for xerophytic areas: open and dry lands, more rarely in gardens. Wasser (1979) has found it commonly in the U.S.S.R. (Ukraine and Armenia) in dry steppes, and comments on the adaptation of the rooting stipe to dry lands. The distribution is limited to Europe and North Africa.

Alessio (1988) has recently considered *L. pinguipes* (Pearson) Bon to be a variety of *L. macrorrhizus* on the basis of their macroscopic characters, differing in the sandy maritime areas, and a scarcely rooting stipe.

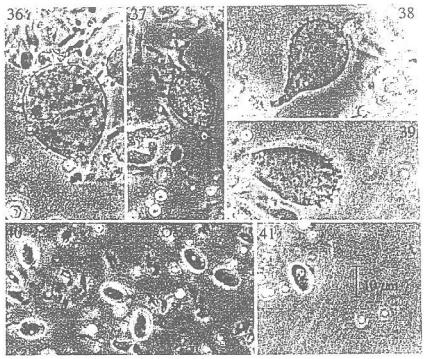
Specimens examined: In uncultivated lands barbechos, on basic soil, Guma, Burgos, 8 Oct. 1987, F. Esteve-Raventós 11622; in gardens, Charleville, France, Oct. 1970, Denoix 70307 (Herb. M. Bon).

Mycena chlorantha (Fr.: Fr.) Kummer, *Führ. Pilzk.*: 110 (1871). (Figs 36–41)

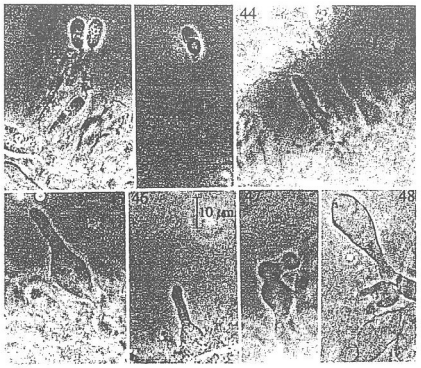
Our collection agrees well with the description of Maas Geesteranus (1984), except for the spores that are somewhat smaller. It represents a new record for the Iberian Peninsula and shows the following characters. *Pileus* –2 cm diam, hemisphaerical at first, then convex, green-olivaceous, hygrophanous and striate when moist. *Lamellae* ascendant, ventricose, adnate to emarginate near the stem, whitish with greenish tints at first, then grey with greenish-yellowish tints; edges yellow. *Stipe* –4·5 × 0·2 cm, cylindrical, smooth, slightly pruinose at the apex, greyish with greenish tints, the base strigose and covered by yellowish rhizoids. *Taste* none. *Odour* strongly of iodoform when old. *Spores* 8·2–9 × 4·3–5·2 µm, ellipsoid, smooth, hyaline, amyloid. *Basidia* 4-spored, clavate. *Cheilocystidia* 25–45 × 10–23 µm, clavate, with apical, cylindrical excrescences of variable length (–8 µm), more or less distant. *Pleurocystidia* similar to cheilocystidia. *Pileipellis* with short excrescences. *Context* dextrinoid; clamp-connexions present.

Mycena chlorantha belongs in the Section *Filipedes* (Maas Geesteranus, 1980), and is easily recognized by the green-olivaceous colours of the basidiome, lamellae lacking pinkish tints, smell iodoform, and its ecology. *Mycena flavescens* Velen. is very close, but devoid of greenish colours and its smell is

Figs 36–41. *Mycena chlorantha*, 11478, cystidia, spores.



Figs 42–48. *Mycena olivaceomarginata*, 11675, basidium, spores, cystidia.



raphanoid. *Mycena arcangeliana* (= *M. oortiana* auct.) is similar but shows pinkish tints at the lamellae at maturity and has a different ecology.

It is important to emphasize that our material was collected on buried stems of Poaceae in sandy soil, but not in coastal dunes, which seems to be the typical habitat of this species; nevertheless, Dr R. Courtecuisse kindly confirmed our determination as very typical. Courtecuisse & Guimbertau (1985) have recently described caespitose forms, indicating their frequency in the coastal dunes in northern France. Known in Europe from Denmark, France, Great Britain and The Netherlands; it has also been recorded recently in West Germany (Krieglsteiner, 1985). It always grows on Poaceae debris (*Ammophila, Leymus, Carex*, etc.) in sandy soils, normally in coastal dunes. A photograph has been recently published by Elborne (1989).

Specimens examined: On buried stems of Poaceae, in sandy soil, El Cabaco-La Alberca (Salamanca), 3 Dec. 1988, M. Ladero 11478.

Mycena olivaceomarginata (Massee) Massee, *Br. Fung. Flora* **3**: 116 (1893). (Figs 42–48)

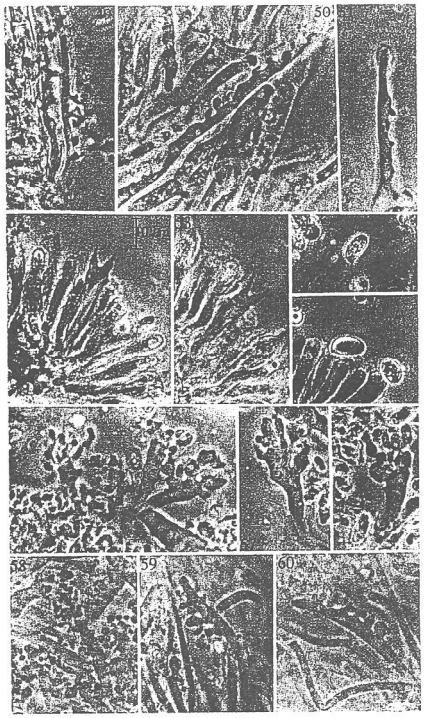
Mycena brunneomarginata Kühner, *Encycl. Mycol.* **10**: 419 (1938).

Mycena avenacea auct.

Highly variable in colour (Arnolds, 1982), this praticolous species of Section *Rubromarginatae* (Maas-Geesteranus, 1986), is not rare in the xerophytic grasslands of the Iberian Peninsula. However, it has only been recorded a few times before: Maire *et al.* (1933) and Maire (1937) from Catalonia, Losa-Quintana & Freire (1978) from Galicia and Esteve-Raventós (1987) from Madrid, always as *M. avenacea*. Our specimens show a red to purplish lamella-edge and yellow to olivaceous stipe, which matches the strict sense of *M. olivaceomarginata* (Maas Geesteranus, 1986).

Specimens examined: Among Poaceae, in acid soil, Húmera, Madrid, 10 Nov. 1988, G. Moreno 11675.

Figs 49–60. *Mycena pseudopicta*, 11623. Figs 49–51. Epicutis. Figs 52–53. Bisporic basidia. Figs 54–55. Spores. Figs 56–57. Cheilocystidia. Figs 58–60. Caulocystidia.



Mycena pseudopicta (J. E. Lange) Kühner, *Encycl. Mycol.* **10**: 363 (1938). (Figs 49–60)

Omphalina pseudopicta J. E. Lange, *Dansk. bot. Ark.* **6**: 15 (1930).

This is an interesting species with omphalinoid habit, which belongs to Section *Cinerellae* (Maas Geesteranus, 1986*b*), according to the subdivision of this genus made by Maas Geesteranus (1980). The species of this section are characterized by the omphalinoid habit, greyish to brownish colours, moist to viscid basidiomes, adnate to very decurrent gills, amyloid spores and cystidia with many coralloid excrescences. *Mycena pseudopicta* can be differentiated by its 2-spored basidia, absence of clamp-connexions, no particular smell, decurrent to triangular lamellae and very branched cystidia with irregular and large excrescences.

It seems to be distributed throughout Europe, although infrequent; it is known from Denmark, France, Greenland, Iceland, The Netherlands, Switzerland and West Germany; also from Spain, where it was previously recorded once by Mendaza & Díaz (1987) and north of Africa (Morocco) by Malençon & Bertault (1975). Complete descriptions and comments on this species can be found in Kühner (1938), Huijsman (1960) and Maas Geesteranus (1980, 1986*b*). Ecologically, *M. pseudopicta* is a graminicolous-heliophilous species, though it is not only restricted to grasslands; Courtecuisse (1984) has found it under shrubs and trees of various kinds.

Specimens examined: In xerophytic grasslands, among Poaceae, in basic soil, Alcalá de Henares University, Madrid, 10 Nov. 1988, J. Alvarez & C. Bartolomé 11623.

We wish to express our gratitude to H. Romagnesi, P. Heinemann (for his comments about *Agaricus goossensiae* var. *pseudolutosus*), M. Bon (for his revision of *Lepiota locquinii* forma *rioussetiae* and for material from his herbarium) and R. Courtecuisse (for his revision of *Mycena chlorantha*). We also thank the Ministerio de Educación y Ciencia for the concession of the Research Project No. PA 86-0063 to carry on with this work.

REFERENCES

ALESSIO, C. L. (1988). *Leucoagaricus macrorrhizus* Locq. ex Horak var. *pinguipes* (Pearson) n. comb. *Micologia Italiana* **2**, 7–11.

ARNOLDS, E. (1982). Ecology and coenology of macrofungi in grasslands and moist heathlands in Drenthe, the Netherlands. Part 2 and 3. *Bibliotheca Mycologica* **90**, 1–501.

BON, M. (1981). Clé monographique des 'Lepiotes' d'Europe (Agaricaceae, Tribus Lepioteae et Leucocoprineae). *Documents Mycologiques* **43**, 1–77.

BON, M. (1985*a*). Clé monographique du genre *Agaricus* L.: Fr. *Documents Mycologiques* **60**, 1–37.

BON, M. (1985*b*). Novitates. *Documents Mycologiques* **61**, 46.

BON, M. (1987). *The Mushrooms and Toadstools of Britain and Northwestern Europe*. London: Hodder & Stoughton.

CAPELLI, A. (1984). *Fungi Europei*. Agaricus *L.: Fr.* (Psalliota *Fr.*). Biella Giovanna, Saronno.

COURTECUISSE, R. (1984). Transect mycologique dunaire sur la cote d'Opale (France), (1ere Partie: Les groupements héliophiles et arbustifs de la xerosère). *Documents Mycologiques* **57–58**, 1–115.

COURTECUISSE, R. & GUIMBERTEAU, J. (1985). *Mycena chlorantha* fo. *caespitosa* Courtecuisse & Guimberteau fo. nov. *Documents Mycologiques* **61**, 51–54.

DONELLI, G. & SIMONINI, G. (1984). Un fungo raro e amanti dei periodi siccitosi: *Leucoagaricus macrorrhizus* (Locq. ex Horak) Sing. *Bolletino del Gruppo micologico G. Bresadola, Trento* **27**, 183–185.

DONELLI, G. & SIMONINI, G. (1989). *Coprinus vosoustii* Pilát e *Coprinus phlyctidosporus* Romagn. var. *monobisporus* Donelli et Simonini. *XIII Mostra Reggiana del Fungo. 1, 2 et 3 Ottobre 1988. Assoc. Micol. Bresadola. Gruppo "R. Franchi"*; 11–21. Reggio Emilia.

ELBORNE, S. A. (1989). Danske Klitsvampe. *Svampe* **19**, 1–11.

ESTEVE-RAVENTÓS, F. (1987). Contribución al conocimiento taxonómico, ecológico y corológico del orden Agaricales s.l. (Basidiomycotina) en el Sistema Central (Madrid y Segovia). Tesis Doctoral, Universidad de Alcalá de Henares (Madrid).

HEINEMANN, P. (1956). *Flore Iconographique des Champignons du Congo. 5e fascicule*: Agaricus *I.* Jardin Botanique de l'état, Bruxelles.

HUIJSMAN, H. S. C. (1960). *Mycena miserior* Huijsm., spec. nov. et *Mycena pseudo-picta* (J. Lange) Kühn. *Persoonia* **1**, 331–334.

KRIEGLSTEINER, G. J. (1985). Uber neue, seltene, kritische Makromyzeten in der Bundesrepublik Deutschland (Mitteleuropa). VI. *Zeitschrift für Mykologie* **51**, 85–130.

KÜHNER, R. (1935). Le genre *Galera*. *Encyclopédie Mycologique* **7**, 1–240.

KÜHNER, R. (1938). Le genre *Mycena*. *Encyclopédie Mycologique* **10**, 1–710.

LANGE, J. E. (1939). *Flora Agaricina Danica* **4**. Copenhagen.

LOSA-QUINTANA, J. M. & FREIRE, L. (1978). Macromicetes en Galicia: otoño 1975-invierno 1976. *Braña, Boletín de la Sociedad Gallega de Historia Natural* **1**, 50–74.

MAAS GEESTERANUS, R. A. (1980). Studies in Mycenas-15. A tentative subdivision of the genus *Mycena* in the Northern Hemisphere. *Persoonia* **11**, 93–120.

MAAS GEESTERANUS, R. A. (1984). Conspectus of the Mycenas of the Northern Hemisphere-3. Section Filipedes. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen* C **87**, 413–447.

MAAS GEESTERANUS, R. A. (1986*a*). Conspectus of the Mycenas of the Northern Hemisphere-8. Sections Intermediae, Rubromarginatae. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen* C **89**, 279–310.

MAAS GEESTERANUS, R. A. (1986*b*). Conspectus of the Mycenas of the Northern Hemisphere-7. Section Cinerellae. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen* C **89**, 183–201.

MAIRE, R. (1937). Fungi Catalaunici. Contribution a l'étude de la Flore Mycologique de la Catalogne. *Publicacions de l'Institut Botanic, Barcelona* **3**, 1–128.

MAIRE, R. CODINA, J. & FONT QUER, P. (1933). Fungi Catalaunici. Contributions a l'étude de la Flore Mycologique de la Catalogne. *Treballs del Museo de Cienciès Naturals de Barcelona, Ser. Botánica* **15**, 1–120.

MALENÇON, G. & BERTAULT, R. (1970–1975). *Flore des Champignons Supérieurs du Maroc. Tomes 1 et 2*. Institut Scientifique Chérifien et Faculté des Sciences. Rabat.

MENDAZA, R. & DIAZ. E. (1987). *Las setas. Guía fotográfica y descriptiva*. Iberduero. Vizcaya.

MORENO, G. (1976). Estudio sistemático, ecológico y corológico del orden Agaricales (Basidiomycetes) en España. Tesis Doctoral, Universidad Complutense de Madrid.

MORENO, G. (1978). Algunas especies del género *Conocybe* Fayod que fructifican en los jardines y parques de la provincia de Madrid. *Acta Botánica Malacitana* **4**, 5–10.

MORENO, G. & ESTEVE-RAVENTÓS, F. (1988). Agarics from

xerophytic grasslands in Central Spain. *Transactions of the British Mycological Society* **90**, 407–413.
ORTON, P. D. & WATLING, R. (1979). *British Fungus Flora. Agarics and Boleti 2. Coprinaceae*: Coprinus. Edinburgh: Royal Botanic Garden.
SINGER, R. (1986). *The Agaricales in Modern Taxonomy*, 4th edn, J. Cramer. Vaduz.
ULJÉ, C. B. & BAS, C. (1988). Studies in *Coprinus*-I. Subsections Auricomi and Glabri of *Coprinus* section Pseudocoprinus. *Persoonia* **13**, 433–448.
WASSER, S. P. (1979). *Fungorum Rariorum Icones Coloratae. Pars X*. J. Cramer. Vaduz.
WATLING, R. (1983). Observations on the Bolbitiaceae: 22. Further validations. *Notes from the Royal Botanic Garden of Edinburgh* **40**, 537–558.

(Received for publication 25 July 1989)