

NOTES ON CYSTOLEPIOTA SEMINUDA

ELSE C. VELLINGA

Rijksherbarium, Leiden

A description of *Cystolepiota seminuda* (Lasch) Kumm. is given. It is shown that this name is correct, and that *C. sistrata* is not conspecific. *Cystolepiota sororia* (Huijsm.) Sing. is reduced to the synonymy of *C. seminuda*.

The genus *Cystolepiota* has been created by Singer (in Singer & Digilio, 1952) for the taxa of *Lepiota* with non-dextrinoid spores and a pileipellis made up of globose elements. Later, this concept has slightly changed for the European species (Singer & Cléménçon, 1972; Knudsen, 1978, 1980; Bon, 1981).

This paper deals with one species only, belonging to *Cystolepiota* sensu stricto, with non-dextrinoid spores. An attempt has been made to study the variability of *Cystolepiota seminuda*, and the nomenclature of this taxon is elaborately discussed.

Cystolepiota seminuda (Lasch) M. Bon—Figs. 1–4, 6

Agaricus seminudus Lasch in Linnaea 3: 157. 1828. — *Lepiota seminuda* (Lasch) Kumm., Führ. Pilzk.: 136. 1871. — *Lepiota sistrata* var. *seminuda* (Lasch) QuéL., Champ. Jura Vosges 1: 231. 1872. — *Cystoderma seminuda* (Lasch) Fay. in Annls Sci. nat. (Bot.) VII, 9: 351. 1889. — *Cystolepiota seminuda* (Lasch) M. Bon in Docum. mycol. 6(24): 43. 1976; Kalamees in Urbonas & al., Conspect. Fl. Agaric. Fung. Lith., Latv., Est.: 48. 1986 (superfluous comb.).

Lepiota sororia Huijsm. in Persoonia 1: 326. 1960. — *Cystolepiota sororia* (Huijsm.) Sing. in Beih. Sydowia 7: 67. 1973.

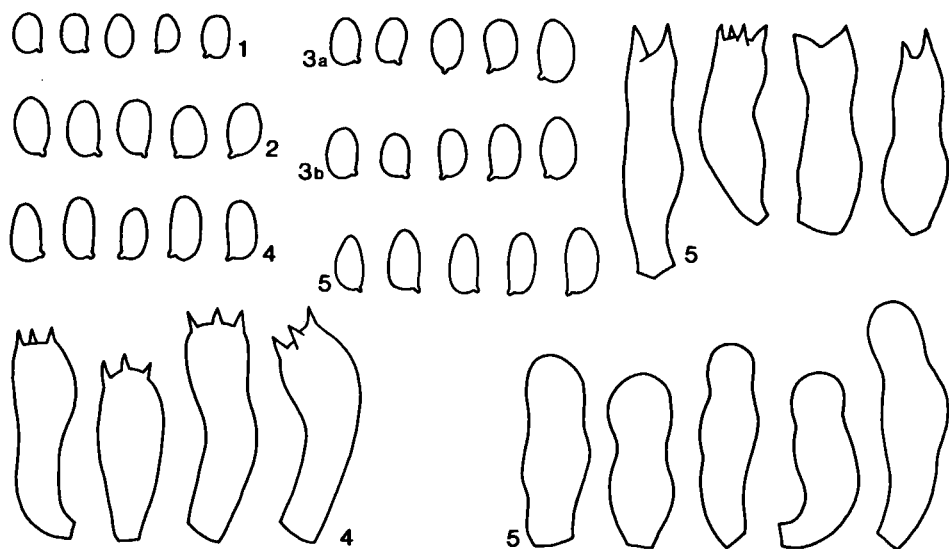
Lepiota seminuda f. *minima* J. Lange, Fl. agar. dan. 1: 36. 1935 (invalid, no Latin diagn.). — *Lepiota sistrata* f. *minima* (J. Lange) Babos in Annls hist.-nat. Mus. natn. hung. 50: 91. 1958 (invalid, basionym not valid).

Misapplied names.—*Lepiota sistrata* and *Cystolepiota sistrata* sensu auct. eur.

Selected illustrations.—J. Lange, Fl. agar. dan. 1: pl. 14A, 14B. 1935; Lanzoni & Candusso in Bol. Gruppo micol. 'G. Bresadola' Trento 26: 116. 1983 (as *C. sistrata*).

Selected descriptions.—Babos, l.c.: 81. 1958 (as *L. sistrata* f. *minima*); Huijsm., l.c.: 326–327. 1960 (as *L. sororia*); Lanzoni & Candusso, l.c.: 114–115. 1983 (as *C. sistrata*).

Pileus 3–20(–30) mm, hemispherical to obtusely conical when young, with inflexed margin, with velar remnants between margin and stipe, expanding to plano-convex with or without low umbo, white, white with cream to yellowish tinge at centre, or white with pinkish tinge at centre, when young with densely floccose-verrucose covering, later on granulose to pruinose-farinose, or even glabrous. Lamellae, L = 30–40, l = 1–3, rather crowded, free or nearly free, ventricose or subventricose, 2–3 mm wide, white, yellowish-creamy, or with pale lemon-yellow tinge, with even to finely flocculose edge. Stipe 15–50(–70) × 1–3 mm, cylindrical, fistulose, cream to pale lemon-yellow, lower down to the base mostly purplish or vinaceous pink, with age and when touched, some-



Figs. 1–4. *Cystolepiota seminuda*. — Spores ($\times 1500$) and basidia ($\times 1500$). (Fig. 1. from C. B. Uljé 639; Fig. 2. from H. S. C. Huijsman 1651; Fig. 3. from E. C. Vellinga 1005, a. in ammonia, b. in ammonia and acetic acid; Fig. 4. from H. S. C. Huijsman, 18 Oct. 1959, holotype of *L. sororia*).

Fig. 5. *Cystolepiota* spec. — Spores ($\times 1500$), basidia ($\times 1500$), and cheilocystidia ($\times 1500$) (all from H. S. C. Huijsman, 18 Oct. 1959).

times with greyish tinge, very rarely not reddening at all, minutely pubescent at apex, downwards whitish pruinose when young, mostly glabrescent with age. Context thin, concolorous with surfaces. Smell not distinct to fruity-fungoid. Taste indistinct. Spore print white.

Spores $3.5\text{--}5.0(-5.5) \times 2.0\text{--}3.0 \mu\text{m}$, $Q = 1.35\text{--}2.1(-2.2) \mu\text{m}$, $\bar{Q} = 1.45\text{--}1.95$, ellipsoid, oblong, cylindrical, rather thin-walled, without germ pore or callus, not dextrinoid, not metachromatic in Cresyl Blue, slowly pink in Congo Red; wall pale blue in Cotton Blue, not swelling in ammonia and acetic acid; hilar appendage indistinct to distinct. Basidia $11\text{--}19 \times 4.5\text{--}6.5 \mu\text{m}$, 4-spored. Cheilo- and pleurocystidia absent. Pileipellis a several cells thick layer of rather thin-walled to slightly thick-walled globose, spheropedunculate to ellipsoid elements, $15\text{--}40 \mu\text{m}$ in diam.; inner elements thin-walled and compressed, colourless, outer elements with incrusting colourless pigment. Stipitipellis a cutis made up of cylindrical hyphae, $4\text{--}10 \mu\text{m}$ in diam., with (some) scattered globose elements similar to those on pileipellis. Clamp-connections present.

Habitat & distribution. — Mostly gregarious, rarely solitary, in various forest types: in deciduous forests on rich soil, in *Picea*-plantations, in grass lawns, on humous sandy to loamy soils; once recorded from wood. In temperate zones of the Northern Hemisphere. Not common in the Netherlands, with a slight preference for loamy soils. Aug.–Oct. (rarely in the beginning of Nov.).

Collections examined.—NETHERLANDS: prov. Gelderland, Steenderen, Baak, 22 Oct. 1974, H. S. C. Huijsman 1651 (L); prov. Noord-Holland: Amsterdam, Amsterdamse Bos, 5 Oct. 1983, C. B. Uljé 454 (Herb. Uljé); ibidem, 17 Aug. 1985, C. B. Uljé 639 (Herb. Uljé); ibidem, 15 Sept.

1986, C. B. Uijé (E. C. Vellinga 1005, L); Bloemendaal, Koningshof, 2 Nov. 1974, C. Bas 6505 (L); prov. Zuid-Holland, Rotterdam, Kralingerhout, 30 Sept. 1961, C. Bas 2455 (L); prov. Zeeland, Zeeuws Vlaanderen, Aardenburg, Waterlandkerkje, Jagersbos, 19 Oct. 1982, A. de Meyer 645 (L). — BELGIUM, prov. Limburg, Teuven, 4 Oct. 1964, J. van Brummelen 1795 (L). — FRANCE: dpt. Moselle, Loudrefing, Forêt dominiale de Fénétrange, 20 Aug. 1955, R. A. Maas Geesteranus 10564 (L); dpt. Oise, Compiègne, Oct. 1937, H. S. C. Huijsman 1044 & 1045 (L). — GERMAN FEDERAL REPUBLIC, Bayern, Haspelmoor, 4 Aug. 1982, Th. W. Kuyper 2103 (L). — SWITZERLAND: kt. Bern: Aneth, Schwarzgraben, 14 Oct. 1959, H. S. C. Huijsman (L); ibidem, 18 Oct. 1959, H. S. C. Huijsman (holotype of *Lepiota sororia*, L); kt. Aargau, Brugg, along the river Aare, 30 Oct. 1959, H. S. C. Huijsman (L).

This taxon, as described above, has been known in recent literature (e.g. Moser, 1983: 236) as *Cystolepiota sistrata* (Fr.: Fr.) Sing., or as *Lepiota seminuda* (Lasch) Kumm. (e.g. Kühner & Romagnesi, 1953: 395); sometimes both taxa are distinguished.

Fries (1821: 24) described *Agaricus sistratus* as a fungus with a slightly pruinose white pileus, yellowish with age, 3.7–5 cm broad and a white stipe, 5–7.5 × 0.25–0.37 cm.

Lasch (1828: 157) described *Agaricus seminudus* as a delicate fungus with a white to pale flesh-coloured pileus, 0.7–0.9 cm broad, and a white stipe, reddening when touched, 3.7–5 × 0.06–0.08 cm.

It is clear from those two (shortened) descriptions that the description given above fits excellently Lasch's description. Size and colours of the fruit-bodies agree well.

Fries' fungus is quite a different species, not reddening and with a relatively broad pileus and thick stipe. Even the stoutest specimens of *C. seminuda* are more fragile and smaller than *A. sistratus*, which possibly is identical with *Lepiota subalba* Kühner. Fayod (1889: 351) has also stressed that the two taxa are not the same, making the new genus *Fusispora* for *A. sistratus*. This genus is characterized by the spores: fusiform with a truncate apex and a suprahilar depression. If *A. sistratus* would be conspecific with *A. seminudus*, the genus *Cystolepiota* should be called *Fusispora*, a rather unpleasant situation, as the spores of the species in this genus are not fusiform, with those of *C. bucknallii* as an exception.

The confusion concerning the name and interpretation of *A. sistratus* has been started by Fries himself, who considered *A. seminudus* Lasch at one hand a synonym of his *A. sistratus*, in 1832(: 41), 1854(: 14), and 1869(: 15)—in the last mentioned publication with the addition that both taxa differ in habitus, but other distinguishing characters are not found—at the other hand, however, as a distinct species, in 1838(: 18) and in 1874(: 37, 38). Furthermore, the sizes of pileus and stipe of *A. sistratus* decrease in Fries' time: in 1854(: 14) pileus 2.5–3.7 cm, stipe as in 1821(: 24), and in 1869(: 15) pileus broader than 2.5 cm, and stipe $\pm 5 \times 0.12$ cm. On account of the differences in colour even the last mentioned description does not fit in with that of Lasch. The plate in Fries' *Icones* (1867–1869: pl. 15) does not depict Fries' *A. sistratus*, but as Fries states, that variant of Lasch ('formam Laschii'—compare *A. expallens* Persoonii, on page 54 in the same work). In our opinion the plate is not very typical for *A. seminudus*; Fries had not seen Lasch's fungus himself.

Bon (1981: 24) distinguished two small species, *Cystolepiota seminuda* and *C. sistrata*; the latter with the following characters: specimens not as delicate and gracile as *C.*

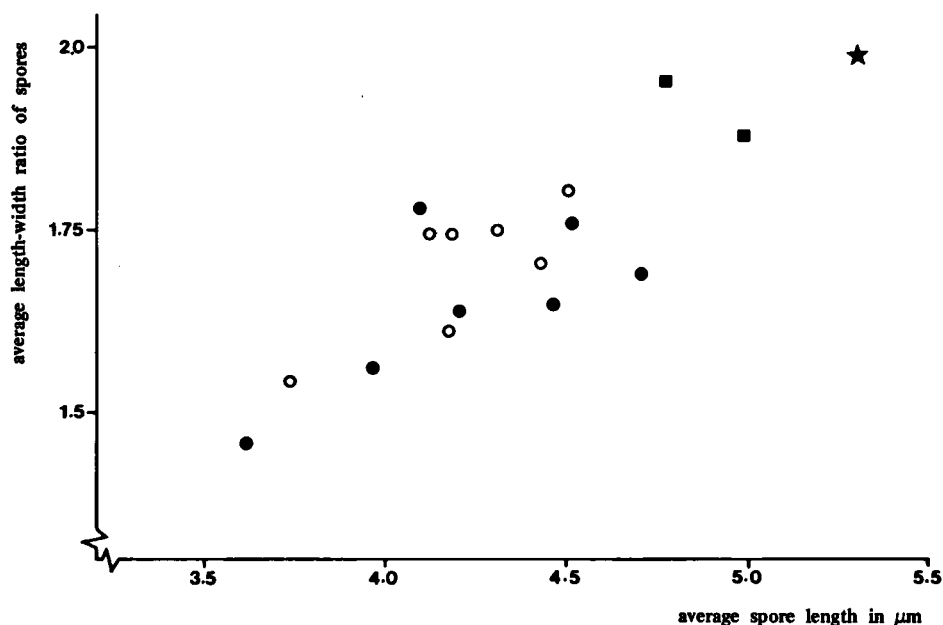


Fig. 6. *Cystolepiota seminuda* and *C. spec.* Scatterdiagram: spore-length plotted against length-width ratio of spores. Each dot represents an average of 10 measurements per collection. ○ *C. seminuda* from the Netherlands; ● *C. seminuda* from abroad; ■ holotype of *L. sororia*; ★ *C. spec.*

seminuda, pileus 1–3 cm broad, pileus and stipe pinkish, with strongly appendiculate margin; spores 4.5×2.5 – $3 \mu\text{m}$. Bon clearly misinterprets Fries' description. He uses rather artificial characters to distinguish his two taxa, and his description of *C. sistrata* fits in with the above description of *C. seminuda* rather well.

Huijsman (1960: 326) described *Lepiota sororia*, differing from *L. sistrata* (as he called it) in the size of the fruit-bodies, the pale lemon-yellow tinges in the lamellae and the apex of the stipe, the copious velum, and the longer spores. Reexamination of the type collection revealed the spores to measure $(4.2\text{--})4.6\text{--}5.3\text{--}(5.4) \times (2.1\text{--})2.3\text{--}2.9\text{--}(3.0) \mu\text{m}$, $Q = (1.65\text{--})1.7\text{--}2.1\text{--}(2.2)$, $\bar{Q} = 1.88\text{--}1.95$ (20 spores, 2 fruit-bodies).

Fig. 6 gives a scatter diagram of the distribution of the average spore-length plotted against average length-width ratio ($\bar{Q}$) of the spores of all collections of *C. seminuda* and *C. sororia* studied. The spores of *C. sororia* are longer and narrower than those of the *C. seminuda* collections, but the extreme values do not exceed those of *C. seminuda*. Using these characters it seems impossible to distinguish *C. sororia* as a separate species.

The other characters used by Huijsman (1960) to distinguish *L. sororia* occur all in individual fruit-bodies of *C. seminuda* as well. It is striking that this taxon, mentioned by Moser (1983: 235) and by Bon (1981: 24) in their keys, has never been found again since 1960. Both authors give the same sizes for the spores as did Huijsman. For the

time being, awaiting the rediscovery of this variant, this name is reduced to the synonymy of *C. seminuda*.

Huijsman made another collection, close to *C. seminuda* from the same locality and of even date as the type of *L. sororia*. This collection also lacks pinkish colours as present in typical *C. seminuda*, and has the following microscopical characters (see Fig. 5): spores $5.0-5.8 \times 2.4-3.0 \mu\text{m}$, $Q = (1.7-1.75-2.15(-2.25))$, $\bar{Q} = 2.0$; basidia $16-20 \times 5-6 \mu\text{m}$, 2- and 4-spored; cheilocystidia $11-17 \times 5-6 \mu\text{m}$, cylindrical and subcapitate, more or less utriform; pileipellis made up of globose to ellipsoid elements, $15-35 \mu\text{m}$ in diam., rather thin-walled, colourless, with scattered cylindrical elements.

This variant, with its striking features, also awaits rediscovery before being described in its own right.

Probably also the American taxa *Lepiota hemisphaerica* Murrill and *Agaricus pusillomyces* Peck belong to *Cystolepiota seminuda*.

ACKNOWLEDGEMENTS

Thomas Kuyper and Dr C. Bas are thanked for critical reading the text. Jan van Os was so kind as to prepare Fig. 6.

REFERENCES

- BON, M. (1981). Clé monographique des "Lépiotes" d'Europe (= Agaricaceae, Tribus *Lepioteae* et *Leucocoprineae*). In *Docum. mycol.* 11(43): 1-77.
- FAYOD, V. (1889). Prodrôme d'une histoire naturelle des Agaricinées. In *Annls Sci. nat. (Bot.)* VII, 9: 181-411.
- FRIES, E. M. (1821). *Systema mycologicum* I. Lundae.
- (1832). *Systema mycologicum*. Index. Gryphiswaldae.
- (1838). *Epicrisis systematis mycologici*. Upsaliae.
- (1854). *Monographia hymenomycetum sueciae*. Upsaliae.
- (1867-1875). *Icones selectae hymenomycetum nondum delineatorum* I. Holmiae.
- (1874). *Hymenomycetes europaei epicriseos systematis mycologici*. Editio altera. Upsaliae.
- HUIJSMAN, H. S. C. (1960). Observations sur les *Lepioteae* Fayod. In *Persoonia* 1: 325-329.
- KNUDSEN, H. (1978). Notes on *Cystolepiota* Sing. and *Lepiota* S.F. Gray. In *Bot. Tidsskr.* 73: 124-136.
- (1980). A revision of *Lepiota* sect. *Echinatae* and *Amyloideae* (Agaricaceae) in Europe. In *Bot. Tidsskr.* 75: 121-155.
- KÜHNER, R. & ROMAGNESI, H. (1953). Flore analytique des champignons supérieurs. Paris.
- LASCH, W. G. (1828). Enumeratio agaricorum marchiae brandenburgicae. In *Linnaea* 3: 153-162, 378-430.
- MOSER, M. (1983). Die Röhrlinge und Blätterpilze. In Gams, H. *Kl. Kryptog.-fl.* 2b/2. 5. Aufl.
- SINGER, R. & CLEMENÇON, H. (1972). Notes on some leucosporous and rhodosporeous European Agarics. In *Nova Hedwigia* 23: 305-344.
- SINGER, R. & DIGILIO, R. P. L. (1952). Prodomo de la flora agaricina argentina. In *Lilloa* 25: 5-461 ('1951').