

Type studies in *Clitocybe* 3.

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The author discusses the type materials of *Clitocybe Arnoldi* Boud., *C. brevipes* Bigelow, *C. griseifolia* Murr., *C. Harperi* Murr., *C. incomis* (Karst.) Orton (*Collybia incomis* Karst.), and *C. piperata* A.H. Smith. Three first-named are found to be synonymous with other species, *C. Harperi* is a species of *Rhodocybe*, *C. incomis* is excluded from *Clitocybe*, and the new combination *Lyophyllum piperatum* (A.H. Smith) Harmaja is made. An undescribed species that is closely related to *R. harperi* is reported, and some connections are noted between the tribe *Lyophylleae* of the family *Tricholomataceae* and the genus *Rhodocybe*.

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Clitocybe arnoldii Boudier ('Arnoldi'), Bull. Soc. Mycol. France 10: 60. 1894. — Holotype examined: France, Somme, Ham, X.1892 Arnould (PC). — Even the macroscopic and microscopic information given in the protologue is suggestive of *Clitocybe sinopica* (Fr.) Kumm., and my study of the type confirms this identity. Although the basidiocarps are very badly preserved, it is evident that they have grown on bare soil, and that there are a few rhizoids at the stipe base. The spore wall was found to be cyanophobic. Boudier himself indicated that *C. arnoldii* and *C. sinopica* were closely related in the label of the type specimen, where the fungus is called *C. sinopica* var. *Arnoldi*. Conclusion: *Clitocybe Arnoldi* is a synonym of *Clitocybe sinopica*.

Clitocybe brevipes Bigelow, Mycologia 50: 38. 1958. — Holotype (part) examined: U.S.A., Michigan, Emmet Co., Wilderness State Park, 22.IX.1953 A.H. Smith 43123 (MICH). — The debris attached to the stipe base reveals that the fruit bodies grew in scanty litter mixed with sand, among remains of dead moss and living *Abietinella abietina* and *Cladina* sp. Macroscopically and microscopically the specimen is a typical *Lepista (Clitocybe) diatrete* (Fr.) Harmaja. Most of the detached spores in the mount are stuck together in tetrads; the spore wall is smooth, inamyloid, carminophobic, and weakly cyanophilic. The spores are uninucleate. The basidial

wall and the ERVs are carminophobic. Conclusion: *Clitocybe brevipes* is a synonym of *Lepista diatrete*.

Clitocybe griseifolia Murrill, Mycologia 5: 208. 1913. — Holotype (?) examined: U.S.A., Washington, Seattle, 20.X.—1.XI.1911 W.A. Murrill (NY). — The microscopic features, as observed in Melzer's reagent, cotton blue, and acetocarmine, are identical with those of the type specimen of *C. Harperi* (see below). Macroscopically, these type specimens are also alike. I consider *C. griseifolia* and *C. harperi* conspecific, and as they were published simultaneously, I herewith choose the latter name for the species. Murrill himself and later also Bigelow (1965, mainly on the basis of Murrill's description) considered that the two species can be kept separate because of small differences in the lamellae, the stipe and the odour. However, these true or supposed differences appear insignificant (at least at the specific level), especially as *C. griseifolia* is known from one specimen only. Conclusion: *Clitocybe griseifolia* is a synonym of *Rhodocybe (Clitocybe) harperi*.

Clitocybe Harperi Murrill, Mycologia 5: 209. 1913. — *Rhodocybe harperi* (Murr.) Harmaja, *Karstenia* 18: 30. 1978. — Holotype examined: U.S.A., California, San Francisco, Golden Gate Park,

22.II.1911 R.A. Harper 57 (NY). — This species, which was reported as new to Europe by me (Harmaja 1969), was recently transferred to *Rhodocybe* Maire (Harmaja 1978). In my paper of 1969, *C. harperi* was considered a deviating element in *Clitocybe* because of the complete or almost complete lack of clamps, but was accepted in the genus. I have now re-examined the type of *C. harperi* and obtained the following results. The walls of the spores and the basidia are cyanophilic, though very weakly so. These walls are carminophobic in acetocarmine stain and the basidia do not contain any distinctly carminophilic granules. The spore nuclei absorb acetocarmine, and almost all of the spores could be seen to possess two nuclei very close to each other, while the remaining spores contained one central nucleus. These characters, together with the lack of clamps, show that *Rhodocybe* is the most natural place for this fungus. However, this species, which constituted a truly deviating element in *Clitocybe*, also has a somewhat isolated position in *Rhodocybe*, because its spore wall is smooth (under the light microscope, $\times 1500$), thin and only weakly cyanophilic. Hitherto the spore wall in *Rhodocybe* has been typically more or less angular, slightly thickened and strongly cyanophilic. The spore deposit of *R. harperi* is also aberrant as it is not distinctly red: the spore colour of the type of *C. griseifolia* was not recorded, and Bigelow (1965) gives the spore print of *C. harperi* as 'white' (which does not exclude the possibility that a pinkish tinge may be observable in thick deposits; cf. also below). Here I wish to report that in a few localities in Finland, on calcareous ground, I have observed a fungus which is microscopically indistinguishable from *R. harperi*, but has a darker, fairly weakly hygrophanous pileus with very thin pruina, broader and slightly more widely spaced lamellae, and a spore deposit which has a distinct red tint. This fungus would appear to be a separate undescribed species, and for the time being I shall call it '*Rhodocybe subharperi*' nom. provis. The red tinge of the spore print in this fungus that is so closely related to *R. harperi* proves that they are both also closely connected with *Rhodocybe*.

Collybia incomis Karsten, Bidr. Känned. Finlands Nat. Folk 32: 164. 1879. — *Clitocybe absinthiata* (Lasch) Sacc. * [= ssp.] *C. incomis* (Karst.) Sacc., Syll. fung. 5: 192. 1887. — *Clitocybe incomis* (Karst.) Orton, Trans. British Mycol. Soc. 43: 174. 1960. — Lectotype, selected here, examined: '*Collybia incomis* Karst., Syrjö, 21 Sept. 1878' (H, Herb. P.A. Karsten no. 2031). — Three specimens of this species are to be found in the collections of H; they otherwise

correspond well to the protologue but one of them has been collected in November 1878 and thus cannot be considered part of the type material. Moreover, one of the remaining two specimens, which were collected in September and constitute the type material in the strict sense, was labelled 'f. *monstrosa*' by Karsten. It does indeed contain deviating basidiocarps with campanulate caps and lamellae attacked by an imperfect parasite, and is consequently less suitable for a lectotype. The fruit bodies in the lectotype have bare sandy soil at their stipe bases, and in habit resemble species of *Fayodia* Kühn. The epicutis is of the common type, composed of clamped, \pm parallel, strongly encrusted hyphae. The basidia are 4-spored and lack carminophilic granules; the wall is carminophobic but very weakly cyanophilic. No cheilocystidia or pleurocystidia were seen (collapsed, inconspicuous or truly absent?). The spores measure $6.5-8.5 \times 4.5-6.2 \mu\text{m}$, are ellipsoid, and have a thin wall, which appears very finely echinulate under a magnification of $600 \times$ but smooth under $1500 \times$. Further, the wall is inamyloid, carminophobic, and weakly but definitely cyanophilic. The monstrous specimen (collected on 22 Sept. 1878, Herb. P.A. Karsten no. 2032) is conspecific with the lectotype though it contains only a few well-developed spores. The third specimen (Nov. 1878, Herb. P.A. Karsten no. 2033) consists of two fruit bodies, the larger of which is conspecific with the above two specimens while the smaller one is not. The latter possesses subglobose to broadly ellipsoid spores measuring ca. $4.0-6.5 \times 3.0-5.0 \mu\text{m}$ and having a smooth thickened amyloid wall; \pm cylindrical cheilocystidia and pleurocystidia are present, and also clamps, and the basidia are 4-spored. This last-mentioned fungus is definitely a *Fayodia*, namely *F. invita* (Karst.) Sing. *Collybia incomis* may be a valid species, though it is sometimes supposed to be identical with *Agaricus pachyphyllus* Fr. 1836—1838, non Berk. 1836. In the latter case the specific epithet '*pachyphylla*' should be retained for the species, since *Clitocybe pachyphylla* Gillet 1874 is to be considered an unintentional *nomen novum* for the later homonym created by Fries, and not a new combination '(Fr.) Gillet'. As yet, I cannot tell whether *C. incomis* is a valid species or a synonym of some older species. As regards the correct generic position of *C. incomis*, *Collybia* (Fr.) Staude does not seem the right place and the species should also be excluded from *Clitocybe* (Fr.) Staude, especially on account of the cyanophilic spore wall. However, it is very difficult to judge to which genus it should be referred. *C. incomis* appears to be close to *Fayodia*,

but a study of the spore wall with the transmission and scanning electron microscopes would be very desirable. Conclusion: *Collybia incomis* may be a valid species; it is excluded from *Clitocybe*, but its generic position is left open.

Clitocybe piperata A.H. Smith, Bull. Torrey Bot. Club 7: 403. 1944. — *Rhodocybe smithii* Harmaja, Karstenia 14: 121. 1974 (non *Rhodocybe piperita* (Stevenson) Horak). — Holotype (part) examined: U.S.A., Michigan, Oakland Co., La Badie Lake, 24.IX.1940 A.H. Smith 15462 (MICH). — I have re-examined the type of *C. piperata* in acetocarmin, using an iron needle to ensure an abundant supply of iron ions. The spore wall proved to be weakly to strongly carminophilic, and the basidia possessed very distinct carminophilic granules (ERVs). The spores have one compact central nucleus each. These new results exclude the species from *Rhodocybe* Maire but are suggestive of *Lyophyllum* Karst. (although clamps are absent). — *C. piperata* is one of an interesting group of agarics which appear to be intermediate between *Lyophyllum* (or *Calocybe* Kühn. ex Donk) and *Rhodocybe*. The other species are: *C. highlandensis* Hesl. & Smith (probably), *C. leucopaxilloides* Bigelow & Smith and *Lyophyllum suburens* Clém. They all lack clamps and have spores that are not smooth (possibly excepting *L. suburens*), and at least *C. leucopaxilloides* has a definitely reddish spore print. Carminophilic basidial granules have been demonstrated in all but *C. highlandensis*, and I have found that the spore wall is cyanophilic in *C. leucopaxilloides* and *C. piperata*. All the above features are very foreign to the true *Clitocybes* and, as I cannot approve the very broad generic concept of *Clitocybe* prevailing in North America, I must exclude these species from that genus. They are certainly also untypical of both *Rhodocybe* and *Lyophyllum* and would appear to deserve a genus of their own, but I think it would be premature to create a further genus for the intricate group of pale-spored Agaricales. Singer (1973) considers that *C. leucopaxilloides* belongs to *Rhodocybe* (I myself referred *C. piperata* to that genus in 1974), while Cléménçon (1968) emphasized the acetocarmin reactions and transferred this species to *Lyophyllum*. For the time being, it seems wiser to refer these species to the latter genus. It should be possible to include clampless species in *Lyophyllum*, although *C. leucopaxilloides* at least also has a reddish spore deposit. As the kind of septa and/or spore colour are

'allowed' to vary in several generally recognized agaric genera, why not in *Lyophyllum*, too? (But the spore hilum should be examined with the SEM to decide whether *Lyophyllum* or the very closely related *Calocybe* is the correct genus; cf. Pegler & Young 1971.) The species group undoubtedly differs from *Rhodocybe* more fundamentally than from typical representatives of *Lyophyllum*: *C. leucopaxilloides* and *C. piperata*, at least possess carminophilic basidial ERVs, a carminophilic spore wall, and spores with only one nucleus. However, a surprising observation recently made by me in *Rhodocybe* shows that the generic relations in this group of the Agaricales are far from settled: the spore wall of *R. truncata* (Fr.) Sing. is distinctly carminophilic when young and very weakly so (or carminophobic?) when mature, while the spores are binucleate and the basidia lack distinctly carminophilic granules (but contain weakly staining ERVs?) as is the rule in *Rhodocybe*. — Conclusion: *Clitocybe piperata* is best included in the genus *Lyophyllum*, and the following new combination is made: ***Lyophyllum piperatum*** (A.H. Smith) Harmaja, n. comb. (*Clitocybe piperata* A.H. Smith, Bull. Torrey Bot. Club 7: 403. 1944.)

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