

Two new species of agarics from northern Fennoscandia: *Clitocybe montana* and *Lactarius lapponicus*

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HARMAJA, H. 1976: Two new species of agarics from northern Fennoscandia: *Clitocybe montana* and *Lactarius lapponicus*. — *Karstenia* 15:19-22.

Clitocybe montana Harmaja (Agaricales) is known from subalpine grass-herb birch forest on calcareous soil in northern Norway. It is probably most closely related to *C. lapponica* Harmaja, from which it differs through the glabrous pileus surface, stronger odour, and different spores and basidia. *Lactarius lapponicus* Harmaja (Russulales) is not uncommon in grass-herb forests in northern Fennoscandia. It resembles *L. mitissimus* (Fr.) Fr. most, but is easily separated from that species by the rapidly and strongly yellowing milk and thicker pilocystidia.

Clitocybe montana Harmaja, n. sp. — *C. lapponicae* sat *similis*; *ab ea differt pileo glabro, odore grato fortiore, basidiis maioribus, sporis brevioribus et guttulis oleosis sporarum valde distinctis*. — *Typus*: Norway, prov. Troms, par. Nordreisa, Javreoaive, Jisdalen, subalpine *Betula tortuosa* grass-herb forest, 1970-08-08, Mauri Korhonen (H).

Pileus ca. 5-12 cm broad, not hygrophanous, not pruinose, pale alutaceous (e.g. when dried 10 E 4, 10 F 4 in MAERZ & PAUL 1950), darker brown when old, low convex when young soon getting plane and more or less depressed but probably never truly infundibuliform; margin distinctly inrolled when young remaining slightly inrolled for a rather long time; surface dry, faintly shining, smooth and glabrous throughout (i.e., epicutis nowhere cracked into areoles or scales).

Stipe 4-7 x 0.8-1.5 cm, at first slightly paler than pileus but darkening somewhat in age, equal or slightly enlarged at base, solid, terete; surface dry, mat, almost glabrous; at the base some whitish tomentum.

Lamellae long and narrowly decurrent, pale buff being slightly paler than pileus, assuming a somewhat more yellowish tinge in drying, not very close, thickish, narrow (ca. 3-4 mm), not conspicuously forked or intervenose.

Context. Consistency of dry basidiocarp hard.

Odour rather strongly sweet, resembling that of *C. geotropa*. A sweetish odour persists in dried fruit bodies.

Taste mild, fungoid both when fresh and dried.

Macrochemical test. *KOH* (5 %): dried pileus surface darkens somewhat to watery brownish in roughly ten seconds. This is, however, considered a negative reaction due to the absorption of the liquid into the context (water was found to have about the same effect).

Spores (in Melzer's unless otherwise indicated) 7.0-9.0(-10.0) x 5.0-7.0 μm ; practically all detached spores single in mounts of dried lamellae (only very few ones adhered together in tetrads); all with a rather abruptly confluent base; fairly uniform in shape all being — broadly or rather broadly — lacrymoid; plage applanated to slightly depressed; wall ca. 0.25 μm thick, smooth, hyaline, inamyloid, indextrinoid, cyanophobic, carminophobic; hilar end ca. 0.9-1.3 μm in diameter; contents weakly to moderately cyanophilic, irregularly guttulate with distinctly refractive oil drops (mostly one large irregular oil drop and some smaller ones present); uninucleate;

exact colour of spore deposit unknown.

Basidia ca. 40–50 × 7.5–8.5 µm, four-spored; wall inamyloid, indextrinoid, cyanophobic, carminophobic; ER vesicles carminophobic (i.e., no carminophilic granulation).

Cystidia of any kind absent.

Hymenophoral trama more or less regular; some oleiferous hyphae present.

Epicutis (in 5 % KOH unless otherwise indicated) rather weakly differentiated, ca. 75–100 µm thick, hyphae interwoven, in places subparallel, 3.0–6.0 µm in diameter; hyphal walls hyaline, cyanophobic; apparently only intracellular pigment present; clamp connections abundant, apparently present at every septum. No subcutis discernible.

Ecology. Found in grass-herb forest on distinctly calcareous soils, occurring both in ± bare mull, in scanty litter of birch leaves and remnants of herbs and grasses mixed with mull, and, essentially, on rotten wood (this last-named connection with woody substrate is most probably only occasional), accompanied by e.g. *Betula tortuosa*, *Equisetum scirpoides*, *Barbilophozia lycopodioides*, *Mnium spinosum* and *Rhytidiadelphus triquetrus*. Early August.

Distribution. Northern part of the northern boreal zone, at an altitude of some hundreds of meters above the sea. Northern Norway.

Discussion. The new species, of which only the type specimen consisting of four fruit bodies is known, belongs clearly to the section *Clitocybe*. *C. montana* most resembles *C. lapponica* Harmaja (HARMAJA 1969), from which it differs through its glabrous and smooth pileus surface, stronger sweet odour, thicker hyphal and basidial walls, larger basidia, and some important spore characters: the spores of *C. montana* are all confluent-based (and thus more uniform in shape in one mount), somewhat shorter, less variable in size, less elongated, and the oil drops they contain are more refractive. *C. montana* differs from *C. altaica* Sing. in thicker hyphal and basidial walls, larger basidia, and different spore features as its spores are larger, less elongated and contain distinct oil drops; in addition, *C. altaica* is not known to occur below the forest limit, at least for the time being.

Lactarius lapponicus Harmaja, n. sp. — *A L. mitissimo praecipue differt lacte mox laete sulphureo mutatur, pilocystidiis leniter crassioribus et distributione multo magis boreali.* —

Typus: Finland, prov. Kuusamo, par. Kuusamo, Liikasenvaara, grass-herb forest on calcareous soil by the lower course of the brook Sirkkapuro, 1974-08-22, Risto Tuomikoski (H).

This new species is apparently most closely related to *L. mitissimus* (Fr.) Fr. It differs from that species above all through the distinct colour change of its originally white milk which rapidly turns bright sulphur yellow on exposure. This colour change is very conspicuous and appears after some seconds, approximately within the same time as in *L. scrobiculatus* (Fr.) Fr. and *L. resimus* (Fr.) Fr. The context is also somewhat thinner in *L. lapponicus* which makes the fruit body contract more in drying and results in a more wrinkled pileus surface in dried basidiocarps. The colours of the fruit bodies of *L. lapponicus* and *L. mitissimus* are indeed very alike in the fresh condition but those of the former appear to lose somewhat more of their brightness in drying, so that the dried basidiocarps of the latter generally display a bit brighter colour. The pileus of *L. lapponicus* is usually more depressed, too. In the new species the projecting hyphal ends of the pileus ixotrichoderm, i. e. the pilocystidia, are clavate to filiform being 2.5–6.0 µm in diameter while in *L. mitissimus* they are mostly filiform and thinner only having a diameter of 2.0–4.0 µm. I did not find any other distinct microscopic differences between these two species; the size, shape and ornamentation of the spores as well as the measures and shape of the cystidia are very alike. As far as known *L. lapponicus* and *L. mitissimus* are also allopatric, i.e. their distribution areas do not overlap each other, the latter being a southern species in Fennoscandia while the distribution of *L. lapponicus* is decidedly northern (see below). Also some minor differences between the species seem to exist (in *L. lapponicus* the gills may be slightly more decurrent and slightly more widely spaced). The new species is separated from *L. lacunarum* Hora through the rapid colour change of the milk, the brighter colour of the basidiocarp, the thicker pilocystidia (quite as from *L. mitissimus*), and the strictly northern distribution. The cystidia of *L. lapponicus* also appear broader and its habitat is usually not so wet and is situated on more fertile soils, on the average. From *L. thejogalus* (Fr.) Gray sensu Neuhoff the present species differs by the more rapidly and more distinctly yellowing milk, the brighter

colour of the fruit body, the distinctly reticulate amyloid ornamentation of the spores, the not "cellular" pileus cortex, the thicker pilocystidia, and the distribution restricted to northern regions. Apparently also the cystidia of *L. lapponicus* are larger and the habitat somewhat different approximately in the same way as from that of *L. lacunarum* (see above). It can be added that, according to KÜHNER (1975), the response of the milk of *L. lapponicus* (as '*L. thejogalus* sensu Fries') to potassium hydroxide is different from that of *L. thejogalus* and *L. lacunarum*.

The descriptions of the following North American species have been compared with the characters of *L. lapponicus*, but despite of some similarities they do not refer to this species: *L. brevipes* Longyear, *L. brevis* Peck, *L. colorascens* Peck, *L. croceus* Burl., *L. duplicatus* A. H. Smith, *L. isabellinus* Burl., *L. substriatus* A. H. Smith, *L. xanthogalactus* Peck and *L. xanthydorrheus* Sing.

L. lapponicus is an inhabitant of grass-herb forest and, according to GULDEN & LANGE (1971, as '*L. lacunarum* forma'), alpine meadow, on fertile soils. Frequently it is found in the company of calciphilous and calcicolous species of plants and fungi (cf. the label notes of the specimens examined). Whether it forms ectotrophic mycorrhiza is not known; if so, individuals of at least the genus *Betula* (at least through *B. tortuosa*) have to be among the assimilating participants.

As stated above, *L. lapponicus* possesses a distinctly northern distribution area. It is found in the middle boreal (southern parts excluded) and northern boreal zones, its frequency increasing northwards; as commonest the species is in the northernmost/uppermost parts of the latter zone, i.e. in the subalpine birch forest formed by *Betula tortuosa*. Judging from the data of GULDEN & LANGE (1971), *L. lapponicus* even occurs in the orohemiarctic (forest tundra) and lower oroarctic (low-alpine) zones. (The vegetation zones of Fennoscandia are according to AHTI et al. 1968.) *L. lapponicus* is only known from northern Fennoscandia, i.e. the northern parts of Finland, Norway and Sweden, at least for the time being.

The present species was known and famous in Fennoscandia since a fairly long time, but unanimousness as to its identity was never reached and it has been called *L. lacunarum* forma, *L. mitissimus* forma, *L. thejogalus*

sensu Fries or *L.* (n.) sp. (see GULDEN & LANGE 1971 and KÜHNER 1975). I have already commented the differences between *L. lapponicus* and *L. lacunarum* and *L. mitissimus* above. *L. thejogalus* sensu Fries is not the correct name for the present species, either, since in the original description of his *Agaricus thejogalus* Fries did not include any direct or indirect reference to such ± orange-coloured strictly northern fungus. What he meant with that name is one or are more than one species with 'rufo-fulvous' and 'subzonate' pileus and 'yellow' milk and which is or are distributed in Central Europe (the reference of the protologue to Bulliard) and/or southern Sweden (where Fries himself exclusively collected fungi before the publishing of the protologue; he had seen the fungus fresh himself). NEUHOFF (1956) believes that Fries originally included in his *A. thejogalus*, besides *A. thejogalus* sensu Bulliard (= sensu Neuhoﬀ, obviously), also *L. chrysorrhoeus* Fr., a species with more or less zonate pileus and rapidly yellowing milk to be described by him later. This would explain the fact that Fries stated the pileus of *A. thejogalus* to be somewhat zonate and the milk 'yellow', by which he apparently meant that the yellowing took place rapidly. Unless the name *A. thejogalus* is abandoned as a *nomen confusum*, a proposal made by some people, the best way to interpret it would seem to be in reducing its meaning to the common and wide-spread species which is known as '*L. thejogalus* sensu Neuhoﬀ'. In fact such a procedure would only stabilize the common current usage. By this way the use of this name in the sense of Bulliard would also be assured, since Neuhoﬀ was thoroughly acquainted with the Central European *Lactaria* and so had the best qualifications for a correct interpretation of Bulliard's fungus.

Selected specimens examined

FINLAND. *Kuusamo*: Kuusamo, Juuma, western end of the gorge Jäkälävuoma, ca. 215 m above the sea, mixed grass-herb forest on very calcareous soil, accompanied e.g. by *Alnus incana*, *Betula alba* coll., *Picea abies*, *Salix caprea*, *Actaea erythrocarpa*, *Cystopteris montana*, *Diplazium sibiricum* (*Athyrium crenatum*), *Gymnocarpium* cf. *heterosporum*; *Salix reticulata*, *Saxifraga aizoides*, *Stellaria calycantha*, *Viola selkirkii*, *Clitocybe harperi*, *Gerronema albidum*, *Helvella costifera* (northern dark form), *Otidea propinquata* (*O. indivisa*) (moreover, in a

near-by calcareous site where *L. lapponicus* was observed but not collected, *Equisetum scirpoides* and *Hygrophorus hyacinthinus* were growing; cf. HARMAJA 1976), 1970-08-27, H. Harmaja (H); Kuusamo, Liikasenvaara, Sirkkapuro, 1974-08-22, R. Tuomikoski (type; H); Kuusamo, Oulankajoki, Taivalköngäs, grass-herb forest on calcareous soil, 1974-08-26, R. Tuomikoski (H). — *Inarin Lappi*: Inari, Laanila, Laanioja, deciduous grass-herb forest with *Betula* and *Salix* by a brook, 1960-08-19, R. Tuomikoski (H).

NORWAY. Troms: Storfjord, Skibottsdalen, ca. 15 km along the road from Skibotn towards Kilpisjärvi, ca. 150-200 m above the sea, moist deciduous grass-herb forest by a brook, accompanied e.g. by

Alnus incana, *Betula tortuosa*, *Populus tremula*, *Prunus padus*, *Angelica archangelica* ssp. *archangelica*, *Dryopteris assimilis*, *Matteuccia struthiopteris*, *Ribes rubrum* coll., *Saussurea alpina*, *Stellaria nemorum*, *Valeriana sambucifolia*, *Viola biflora*, *Helvella macropus*, *Marasmius siccus*, 1972-09-13, H. Harmaja (H).

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