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THE IDENTITY OF HYDNUM VERSIPELLE FR.

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Ample collections preserved at Uppsala under the name *Hydnum versipelle* and two exsiccata of *Sarcodon laevigatus* were examined and compared with the original descriptions. The material of *Hydnum versipelle* is shown to be heterogeneous, comprising three collections belonging to *Sarcodon amarescens*, and ten collections of a species which has the main characters of *Sarcodon laevigatus*. The few differences observed are attributed to differences of a chemical nature, and *Hydnum versipelle* is formally reduced to the synonymy of *Sarcodon laevigatus*.

Hydnum versipelle was described by Fries in 1861 (p. 31) and 1863 (p. 274), and again, accompanying a plate, in 1867 (p. 4, pl. 1). Much later, a second illustration was published by Bresadola (1932: pl. 1040).

Although Lundell (1959: 18) stated to be acquainted with the species since 1923, it was only after the find in 1954 of material that matched Fries's plate that specimens could be distributed as No. 2643 of the Fungi exsiccati suecici.

From the copy of this exsiccatum at Uppsala, it is obvious that there is a very wide range indeed as to the variability of the surface and colour of the pileus. In young specimens the pileus is plushy-tomentose and of a delicate lilaceous grey. The surface in older specimens has turned into a glabrous pellicle, or shows traces of appressed membranaceous squamules, or again is distinctly scaly, with the tips of the scales free from the surface. The colour (always of the dried material) ranges from ochraceous yellow-brown to a rich dark brown suffused with a purplish tint. The context is of a pale greyish yellow down to the very base of the stipe, but in places suffused with a distinct lilaceous violet tint. The hyphae possess clamp-connections.

How do the specimens described above compare with the material previously identified by Dr. S. Lundell as *Hydnum versipelle?* This material, preserved at Uppsala, comprises two clearly distinct groups: (1) with, (2) without clamp-connections.

Group 1 contains the following collections (ecological data omitted).

1. Västergötland: Lerum, 1 VIII 1943, *T. Nathorst-Windahl* (*Hydnum uplandicum* L[unde]ll. ad int. / *H. versipelle* Fr. sensu Litsch.); **2.** Upland: Alsike sn, Lunsen, SO. om Flottsand, 26 VIII 1945, *B. Norkrans* (*Hydnum uplandicum* Lll. det. Lundell: 1945 / [in pencil] *versipelle.* Lll: [19]53); **3.** Upland: Danmark sn, Lunsen, ca 1 km SW. om Bergsbrunna jvstn, 19 VIII 1945, *G. Fåhraeus* (*Hydnum uplandicum* Lll. ad int. / [in pencil] *versipelle.* Lll: [19]53); **4.** Upland: Danmark sn, "Lunsen", ca 2 km SE. om Bergsbrunna jvstation, 25 VIII 1954, *H. Nilsson & J. Eriksson* (*Hydnum versipelle* Fr. / monstruös form / det. Lundell: [19]54); **5.** Upland: Lena sn, Årby skog, Storvreta, 8 VIII 1923, *Seth Lundell* (*Hydnum fulvum* ad int. det. Romell / *versipelle.* Lll: [19]53); **6.** Upland: Lena sn, Årby skog, Storvreta, 4 VIII 1924,

Seth Lundell (*Hydnum fulvum* ad int. det. Romell / *versipelle*. Lll: [19]53); **7.** Upland: Lena sn, Årby skog, Storvreta, 28 VIII 1927, *Seth Lundell* (*Hydnum uplandicum* Lll. ad int. / *versipelle*. Lll: [19]53); **8.** Upland: Lena sn, Årby skog, Storvreta, 30 VII 1930, *Seth Lundell* (*Hydnum uplandicum* Lll. ad int. / *versipelle*. Lll: [19]53); **9.** Upland: Lena sn, Årby skog, Storvreta, 28 VII 1936, *Seth Lundell* (*Hydnum uplandicum* Lll. ad int. / *versipelle*. Lll: [19]53); **10.** Upland: Lena sn, Årby skog, 10 VIII 1942, *Seth Lundell* (*Hydnum uplandicum* Lll. ad int. / *versipelle*. Lll: [19]53).

Group 2 contains three collections (ecological data omitted).

11. Upland: Börje sn, Klista skog, 6 IX 1945, *Seth Lundell* (*Hydnum versipelle* Fr.); **12.** Upland: Börje sn, Klista skog, 11 VIII 1953, *John Eriksson* (*Hydnum versipelle* Fr. det. Lundell: 1953); **13.** Upland: Lena sn, Årby skog, nära Storvreta, 15 VIII 1923, *L. Romell* (*Hydnum scabrosum* nisi *versipelle* / *Hydnum versipelle* Fr. sensu Bres. det. Lundell 1949).

In Group 1 the surface of the pileus is seen to vary from finely tomentose (at the margin), or glabrous (for the greater part and in most of the specimens) to distinctly scaly in the centre, with the scales membranaceous to fibrillose, adnate or, more rarely, somewhat free at the tips. The colour ranges from delicately lilaceous-grey (at the margin) to yellowish grey-brown, with or without a purplish hue, or even dark brown (even darker than the darkest portion in Fries, 1860: pl. 81). The context, as far as visible (e.g. in Nos. 1, 4, and 8), is of the same greyish yellow as in Fungi exs. suec. No. 2643. The stipe is generally paler than the pileus, being dingy pale brownish or pale purplish brown, sometimes lilaceous grey at the apex, and always white-tomentose at the base. All specimens possess clamp-connections.

It is beyond any doubt that all collections of Group 1 are conspecific with Fungi exs. suec. No. 2643. However, the question which now arises is whether Group 1 agrees with Fries's descriptions and illustration or not.

The colour of the pileus in the dried material, although covering a wide range, is certainly not so rufous as it was described and depicted by Fries, but that colour may have gone lost in drying, and Lundell's colour-description (l.c. p. 18) of the fresh material comes close enough to Fries's illustration.

A notable difference would appear to exist between the colour of the flesh as seen by Fries ("Caro concolor, at pallidior," hence ostensibly rufous) and as described by Lundell ("Flesh ... white, ... slowly changing into a faint greyish green.").

From this it might be concluded that either Lundell's material represents a different species from *Hydnum versipelle*, or the discolouring of the flesh is a variable character.

Considering that Fries (1867: 4) stated that his species had been collected on several occasions ("In pinetis Uplandiae pluries lectum."), it would seem strange indeed if the specimens recently found in the same region, and agreeing in the major characters, should prove to be a different species.

It seems, therefore, plausible to assume that the discolouring of the flesh, caused by oxidation, is a variable character, the appearance of which may well depend on age and/or climatic conditions. In this connection it is important to remember

that the context in Fungi exs. suec. No. 2643 in places still demonstrates a lilaceous violet hue which was obviously not there in the freshly cut specimen.

The arguments developed in the preceding paragraphs suggest that Lundell's material of Group 1 is identical with Fries's *Hydnum versipelle*. This being the case, it now becomes necessary to indicate the differences between *Hydnum versipelle* and those species of *Sarcodon* which in Europe are its closest relatives. As *Hydnum versipelle* has been shown to possess clamp-connections, there are only two close relatives, *Sarcodon imbricatus* and *S. laevigatus*. Of these, the former may be dismissed on account of its very coarse scales, which leaves only *S. laevigatus* to be considered.

Lundell (1954: 2), it is true, described the colour of the pileus of *Sarcodon laevigatus* as "greyish brown with a distinct tinge of 'Vinaceous-Purple' (Ridgway), sometimes tending towards 'Dull Dusky Purple'," which colours are altogether different from those he mentioned in *Hydnum versipelle*. However, it should be pointed out that Lundell in attributing these colours to *Sarcodon laevigatus* severely curtailed the colour-range of the species, and in any case deviated from the original description given by Swartz. According to the latter author (1810: 243), the pileus is "pallide castaneus l. ferrugineus." It is interesting to see these colours change over the years. Fries (1815: 140) at first omitted "ferrugineus" and intensified "castaneus" by leaving out the word "pallide." Variety *coriaceum* with its grey pileus is here left out of consideration, as its identity is unknown (Maas Geesteranus, 1960: 353). Then (1821: 399) he changed the colour to "rufo-cinereo" and again (1838: 506) to "fusco-cinereo." Finally (1863: 275, 1866: 47, pl. 81; 1874: 599), he described the pileus as dark brown ("mörkbrun," "umbrino").

None of these colours, it is believed, should be regarded as lacking true observation. Rather do they represent the colour-range of the species under various conditions, and Lundell's additional colours are only an extension of that range.

The colour of the pileus in the dried material of the copies of *Sarcodon laevigatus* at Uppsala (Fungi exs. suec. Nos. 2203, 2204) is decidedly more purplish than in most specimens of *Hydnum versipelle* mentioned above, but anyone trying to use the colour of the pileus of No. 3 of Group 1 as the differential character to separate both species, would find himself in a difficult position.

The structure of the surface of the pileus in *Sarcodon laevigatus* as a distinguishing character is no more decisive than its colour, but some remarks need be made with regard to the colour of the context.

Both Swartz and Fries agreed in describing the context as whitish, and Lundell was even more precise in stating the flesh to be white and unchanging when cut. It is worth noticing that in both exsiccata of *Sarcodon laevigatus* certain portions of the context are of the same greyish yellow as in *Hydnum versipelle* (Fungi exs. suec. No. 2643). Other parts, however, are suffused with a distinct lilaceous hue (No. 2203, in the pileus; No. 2204, in the stipe) or of nearly as dark a purplish brown as the surface of the pileus itself (No. 2203, in the apex of the stipe). It follows that in Sweden *Sarcodon laevigatus*, too, is not altogether devoid of that chemical substance which, on exposure to the air, causes the flesh to discolour.

Summarizing, it appears that there is not a single character which plainly separates *Hydnum versipelle* from *Sarcodon laevigatus*. *Hydnum versipelle*, therefore, is here formally reduced to the synonymy of *Sarcodon laevigatus* (Sw. ex Fr.) P. Karst., and removed from the synonymy of *Sarcodon bubalinus* (Maas Geesteranus, 1956: 48).

The addition of *Hydnum versipelle* to *Sarcodon laevigatus* extends the range of variation of that species, although not much. The fruit-bodies which as a rule appear singly may also be found in clusters. The pileus which is plushy in youth becomes glabrous with age, and the smooth pellicle may crack into scales. The scales are membranaceous to fibrillose, appressed or free at the tips. The colour of the pileus, outlined already by Bourdot & Galzin (1924: 111), ranges from a delicate lilaceous grey through yellow-brown and purplish brown to dark umber, with the scales darker and sometimes violet-brown. The stipe is paler than the pileus, with its base always white-tomentose. The context is white down to the base of the stipe and remains unchanged for a long time (Fungi exs. suec. Nos. 2203, 2204; Barla, Champ. Prov. Nice pl. 38 fig. 6. 1859), or passes into a greyish green (Fungi exs. suec. No. 2643; and France, exposition Belfort, L 956.110–779), or again becomes flushed with purplish red (Bourdot & Galzin, 1924: 111; Bresadola, 1932: pl. 1042). The odour has been described as "reminding one of aniseed with a touch of cucumber" and pleasant on drying (Lundell, 1959: 18) "faible, douceâtre, nauséeuse" (Bourdot & Galzin, 1924: 111), strong and nauseating (Bresadola, 1932: pl. 1042), and somewhat like lysol (France, exposition Belfort, L 956.110–779). The taste ranges from "mild, or in old specimens slightly astringent" (Lundell), "amère après un instant de mastication" (Bourdot & Galzin), bitterish (Bresadola), and "disagreeable, farinose-bitterish (the French collection). Barla who gave an unmistakable illustration of the species indicated the taste as good (l.c. p. 79), but the odour of the withering fruit-body as of *Helychrysum stoechas*, which, as this odour resembles fenugreek, strikes as rather doubtful, and may point to a confusion with some species of *Bankera*.

The examples given above illustrate that the variability of the species is most pronounced in such characters as the colour, discolouring, smell and taste of its flesh. This suggests that the differences are rather due to differences of a chemical nature, on which age and/or edaphic and climatic conditions may have their influence.

A few words need finally be said of Group 2, of which the specimens lack clamp-connections and, therefore, belong to a different species. Of the collections enumerated, No. 12 is the most illustrative as it consists of several young and old specimens, some of which have been cut in half. The part that at once attracts attention is the base of the stipe which is white-tomentose in the younger specimens but ash grey with a distinct greenish hue in the older ones. This character, combined with the glabrous to areolate-scaly surface of the pileus, the reddish discolouration of the flesh, and the lack of clamps, readily determine the collection as belonging to *Sarcodon amarescens* (Quél.) Quél.

Ironically, it was precisely on this collection No. 12 that, on a previous occasion

(Maas Geesteranus, 1956: 48), part of the description of *Sarcodon bubalinus* was based, since insufficient attention was paid to the colour of the tomentum at the base of the stipe. Re-examination of the type of *Hydnum bubalinum*, however, does not lead to the conclusion that *Sarcodon amarescens* and *S. bubalinus* should be united.

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