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A note on Helvella solitaria (syn. H. queletii) and H. confusa n. sp.

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Contrary to the current concept, the type of *Helvella solitaria* Karst. 1871 (*Peziza solitaria* Karst. 1869, non Schwein. 1834) is shown to be conspecific with that of *H. queletii* Bres. 1882. The specific name given by Karsten has priority over the latter name, and is consequently the correct name for the species.

Part of the material treated under *H. solitaria* by H. Dissing was, however, found not to be conspecific with the type. Such material turned out to represent a new species, which is described as *Helvella confusa* Harmaja.

Some other synonymies in *Helvella* are presented and corrected.

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Introduction

In his monographical studies on the genus *Helvella* St-Am. in Europe, Dissing (1966a and b) rehabilitated the long forgotten *Peziza solitaria* Karst. and placed it, as *Helvella solitaria* (Karst.) Karst., in the section *Leucomelaenae* Diss. Karsten (1869), who described *P. solitaria* on the basis of one single apothecium found by him in Tammela, southern Finland, thought at first that his new species was closely related to *P. bulbosa* Hedw. ex Fr., but later (1871) he himself transferred the species to the genus *Helvella.* Since then, Karsten's species was apparently never mentioned in the literature before being dealt with by Dissing (1966a and b). However, J.A. Nannfeldt had commented the species through determinating the type as a very young apothecium of *H. leucomelaena* (Pers.) Nannf. in a label note dated 1942.

However, there exists the name *Peziza solitaria* Schwein. 1834, which antedates *P. solitaria* Karst. 1869, the latter being consequently an illegitimate name as a later homonym. Thus Karsten's intended transfer of his species to *Helvella* is to be considered as unintentional — but actual — creation of the *nomen novum Helvella solitaria* Karst. 1871. This name is the legitimate one to be considered in taxonomy.

When Dissing (1966a) published his monograph, Finnish mycologists felt some doubts about the existence of a valid southern and calcicolous *Helvella* species in the country, a species which was represented by only one apothecium collected a hundred years ago in a locality where the soils are not particularly calcareous. As the three similar-appearing species *H. leucomelaena* (which is pronouncedly calcicolous), *H. cupuliformis* Diss. & Nannf., *H. costifera* Nannf. and *H. queletii* Bres. were unknown in Finland at that time, it was not possible to decide whether the type of *H. solitaria* might represent a young or dwarfed fruit body of one of those species. However, during the last ten years the number of *Helvella* species recognized in Finland has increased rapidly; in 1974, I found *H. queletii* in Lammi parish, in a habitat very similar to that of the type of Karsten's species and decided to check whether *H. solitaria* might simply be based on a young apothecium of *H. queletii.* If this was the case, Karsten's name would take priority over that of Bresadola's. Lammi parish is situated in the same province, Etelä-Häme, as the type locality of *H. solitaria,* Tammela commune the habitat of both finds is similar (garden and park), and the soil in both habitats is not supposed to be truly calcareous (although fairly fertile). A macroscopic and microscopic examination and comparison between the holotype of *H. solitaria* and material of *H. queletii* including the holotype and the Lammi specimen confirmed that these two species are indeed con-

specific. Karsten's species was based on a young apothecium with hardly any fully mature spores, but numerous submature ones.

The question then arose whether the rest of the material treated as *H. solitaria* in Dissing (1966a) also consisted of young fruit bodies of *H. queletii,* i.e. the true *H. solitaria,* or whether some other species were possibly involved. I have examined only one additional specimen actually studied by Dissing and determined by him as *H. solitaria:* part of a very large Danish collection kindly donated by him to the Helsinki herbarium (H). This is part of the collection on which Dissing's actual concept of '*H. solitaria*' is obviously mainly based, and a photograph of which is published as Fig. 10 in Dissing's monograph (1966a). My study of this specimen proved that Dissing was partly right as far as concerns this Danish collection: I found it conspecific with neither *H. queletii* (i.e., *H. solitaria*) nor *H. leucomelaena* nor any other known species of *Helvella*. However, because of his misidentification of the type of *H. solitaria,* Dissing missed the discovery of a new species. This confused new species will be described here as *H. confusa* n. sp., on the basis of the specimen in H mentioned above (as the type) and some additional material.

Before the decision was taken to describe a new species, some type studies had to be made. In the following I report briefly on the results of the examination of the types, type materials or other original materials of the species given as synonymous to *H. solitaria* (*Acetabula calyx*) and *H. leucomelaena* (four other species) by Dissing (1966a; a holotype was not originally designated for any of them).

1) *Acetabula calyx* Sacc., Atti Soc. veneto-trenina sc. natur. 2(2): 216. 1873. — The publication data of this species have almost always been cited incorrectly or insufficiently in the literature. Contrary to Dissing's (1966a and b) opinion, the only known specimen (collected by Saccardo in the type locality, Padova in Italy), which can belong to the type material is the one which was sent to M.C. Cooke and is now deposited in Kew (K). Unfortunately that specimen lacks a date but all the other material to be considered has been collected later than 1873 and in other localities. Moreover, *Peziza calyx* (Sacc.) Sacc. **minor* Sacc. is not a mere herbarium name, as Dissing believes, but a name validly published eight years later by Saccardo (Michelia 2: 258, 1881). My examination of the Kew specimen, which may very well be the holotype (or a part of it), showed it to belong to *H. leucomelaena.* Macroscopically the single apothecium is not quite typical, possessing a rather slender stipe. The apothecium corresponds very well to Saccardo's original illustration, but the spores are distinctly larger than was stated in the protologue. *A. calyx* was treated as a synonym of *H. solitaria* by Dissing (1966), but my conclusion is that *A. calyx* cannot be referred to either of the two species included in Dissing's *H. 'solitaria'*, but is instead a new synonym of *H. leucomelaena. P. calyx* **minor* (the obvious holotype in PAD-Herb. Saccardo studied) I found to be based on young subsessile fairly large-spored apothecia of *H. leucomelaena.* The type of **minor* was likewise determined as *H. solitaria* by Dissing.

2) *Peziza amphora* Quél., Bull. Soc. Bot. France 23:331. 1876. — As Dissing (1966a) did not know any type material of this species, he evidently reduced it to synonymy with *H. leucomelaena* on the basis of information given in the protologue. I asked two probable herbaria, PC and UPS, for such material but was kindly informed by Prof. J. Mouchacca and Dr. R. Moberg, that no material of *P. amphora* was deposited there. Consequently, at present we do not know wheter type material exists and where it may be deposited. However, a more or less topotypic specimen, collected after the publication of the name (2.VII.1881) by Quélet himself in Hericourt which is situated in or close to the type locality in the French Jura, happens to be deposited in H, having obviously been sent to Karsten by Quélet. I consider that this specimen belongs to *H. leucomelaena.* All the evidence available at present suggests that *P. amphora* is indeed a synonym of *H. leucomelaena,* and this possibility was indicated by Quélet himself on the label of the Helsinki specimen.

3) *Peziza Percevali* Berk. & Cooke in Cooke, Mycogr.: 111: Fig. 192. 1876. — The holotype (K-Herb. Berkeley) and an isotype (K-Herb. Cooke; obviously a fragment orginating from the only and now incomplete apothecium of the first-named specimen) have been examined by me. The rather poorly preserved specimens are conspecific. Developed asci are few and only submature and quite young spores, eight per ascus, are present. In Melzer's reagent, the contents of young asci are ± hyaline, and the largest spores are ca. 20—22 (—30?) × 12—15 µm in size, ellipsoid, smooth, with homogenous contents. The paraphyses are clavate, thick, ca. 6—12 µm in diameter, and contain ± dextrinoid drops. The excipulum is at least mainly composed of normal *textura intricata* with rather broad (up to ca. 12 µm) hyphae. These characters, especially the contents of the spores and asci, show that the specimens do not belong to the genus *Helvella.* They apparently represent a species of *Plectania* Fuck. (or *Urnula* Fr.). Dissing (1966a) considered this species a synonym of *H. leucomelaena.*

4) *Peziza Debeauxii* Roumeg., Rev. Mycol. 4: 156. 1882. — The type material was distributed as no. 2174 of Roumeguère's exsiccate 'Fungi Gallici Exsiccati'. All these specimens are syntypes according to the 'Code'; a lectotype was apparently never selected by Dissing or any other person. Two specimens numbered 2174 have been examined by me, from PC and UPS. The Paris specimen represented a taxon close to *H. leucomelaena,* differing from the latter in probably slightly darker apothecia and very large mature spores, which measure 23.0—30.0 × 13.0—15.0 µm. But the Uppsala specimen belongs to *H. leucomelaena.* Dissing (1966a), who examined the Uppsala specimen only, considered Roumeguère's species a synonym of *H. leucomelaena.* The features of the Paris specimen and their discrepancy with those of the specimen in UPS necessitate further study and consideration, e.g. the revision of a good many specimens numbered 2174

deposited in various herbaria. In any case, the characters of *H. leucomelaena* and the Uppsala specimen correspond to the protologue better than those of the Paris specimen.

In this connection, I wish to report that I have seen other specimens, especially from southern Europe and the Mediterranean area, which are very close to *H. leucomelaena* but possess larger spores and apparently slightly smaller and slightly darker apothecia. One possibility is that the spore size is a very variable character in *H. leucomelaena* and such specimens belong to that species. Another explanation is that these deviating specimens represent *H. helvellula* (Dur. & Mont.) Diss. According to the description, this species has small dark apothecia and a southern distribution, but the spore length (if correctly given) does not exceed 21—25 µm (Dissing 1966a). A third possibility is that these specimens belong to an unknown species, distinct from both *H. leucomelaena* and *H. helvellula,* occuring in southern Europe and North Africa. The possibility that they might belong to *H. crassitunicata* Weber (Weber 1975) is eliminated by such characters as the thick-walled paraphyses.

5) *Acetabula simplex* Roll., Bull. Soc. Mycol. France 17: 117. 1901. — The holotype, in PC-Herb. Boudier, was examined by me. I concur with Dissing (1966b), who determined this specimen as *H. leucomelaena.* However, the apothecia appear slightly smaller and darker than is usual in that species and the spores seem fairly large, 22.0—25.0 × 11.0—13.5 µm (cf. discussion under *P. debeauxii* above).

Helvella solitaria Karst.

Peziza solitaria Karst., Not. Sällsk. F. Fl. Fennica Förh. 10: 111. 1869 (illegitimate name as a later homonym; not *Peziza solitaria* Schwein., Trans. American Phil. Soc. 4 (Syn. fung....): 175. 1834). — *Helvella solitaria* Karst., Bidr. Känned. Finlands Nat. Folk 19: 37. 1871 (unintentional *nomen novum*). — Holotype (H) examined.

Syn.: *Helvella queletii* Bres., Rev. Mycol. 4: 211. 1882. — Holotype (S) examined. — I have also examined another original specimen (H); like the holotype, it was collected by Bresadola in May in larch forest in the Trento region, but one year earlier, i. e. in 1881.

Dissing (1966a) lists five specific names as synonyms of *H. queletii.*

The specimen considered the 'type' of *P. solitaria* by Nannfeldt in a label note from 1942 and by Dissing in his papers (1966a and b) does not bear the specific name '*solitaria*' in its original notes but was labelled *Peziza bulbosa* by Karsten. However, the opinion of the two firs-named taxonomists is correct: the reference to *P. bulbosa,* the habitat description, the date, and the morphological notes, all given in Karsten's handwriting, indicate clearly that this specimen, consisting of one single apothecium, is the one on which *P. solitaria* was based. There are no other specimens to be considered in H. The term 'type' used by Nannfeldt and Dissing must, of course, in this case be changed to the more exact 'holotype'.

When not too young, *H. solitaria* can be recognized easily even macroscopically. Dissing's (1966a) description (as *H. queletii*) may be consulted. Photographs of dried apothecia of the species have been published by Dissing (1966a, Fig. 18 and 1966b, Fig. 11: a—d, f). Fresh apothecia are shown in the photographs of Weber (1972, Fig. 28, as *H. queletii*) and in the present contribution (Fig. 1).

Two important new morphological characters of *H. solitaria* can be reported here. A good proportion of submature spores differ from the mostly ellipsoid and uni-guttulate mature ones, especially in Melzer's reagent, in being subfusiform to decidedly fusiform and — probably as a result of this shape — three-guttulate. This interesting feature appears constant, and was a great help when I attempted to clarify the position of the type of *H. solitaria;* some submature spores even resembled those of *H. macropus* (Fr.) Karst. in both shape and size. The character is especially useful in the case of young or untypical apothecia of morphologically similar species; at least *H. leucomelaena* and *H. confusa* appear to lack such spores according to my observations. This kind of submature spores is rare in *Helvella,* but they are present also in *H. palustris* Peck and, to some extent, in *H. dryadophila* Harmaja, where they are also taxonomically useful (cf. Harmaja 1977).

Another important character is the kind of hyphae in the greater part of the excipular *textura intricata.* They are unusually narrow (ca. 2.0—4.0 µm in Melzer's reagent) and of almost the same diameter throughout, i.e. only slightly constricted at the septa. This feature distinguishes *H. solitaria* from e.g. *H. costifera, H. cupuliformis* and *H. leucomelaena* (see below). According to my observations, partly unpublished, this kind of *t. intricata* hyphae is also met within certain other Helvellas: *H. confusa, H. silvicola* (Beck) Harmaja, and, in a slightly less typical form, in *H. crassitunicata* and *H. dryadophila* (Harmaja 1977).

Weber (1972) reported that the ascus development of *H. solitaria* (as *H. queletii*) is pleurorhynchous. I can confirm her observation, having examined the types of *H. solitaria* and *H. queletii* and the Lammi specimen. *H. leucomelaena* and *H. confusa* possess aporhynchous asci (see below).

Mature spores of *H. solitaria* measure according to my observations ca. 16.5—20.0 × 10.0—12.0 (—13.0) µm; submature ones are larger on the average (this appears to be rule in e.g. *Helvella:* cf. Harmaja 1977) even reaching a size of 24 × 15 µm.

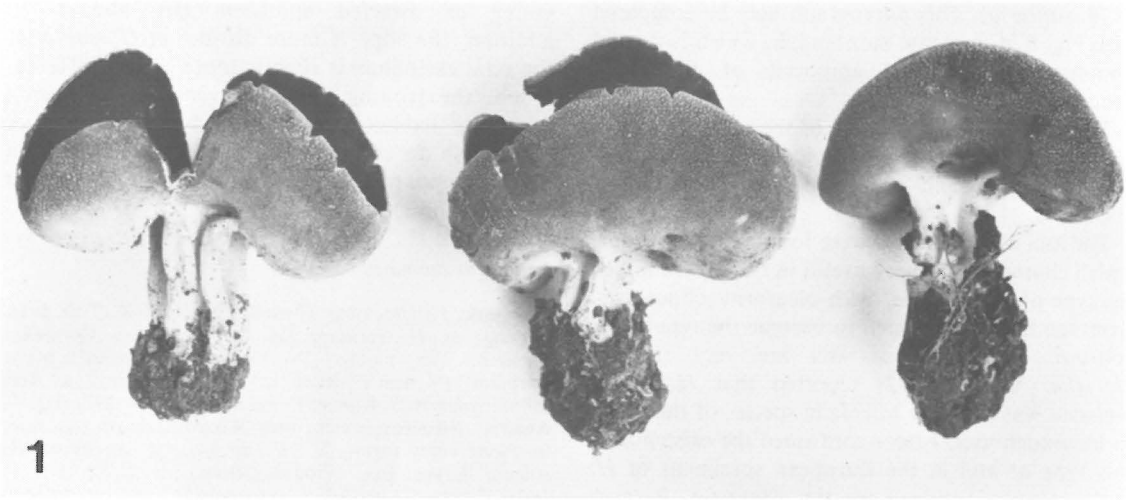

Fig. 1. *Helvella solitaria.* Fresh apothecia, × 1.5. — Finland, Etelä-Häme, Lammi, Pappilankylä, Biological Station of the University of Helsinki, 8.VII.1974 H. Harmaja (H). Photo: Tuomo Niemelä.

The variable characters of *H. solitaria* include the colours of the apothecium, the hairiness of the external surface of the cup, the number of ribs of the stipe, and the stipe length and width. At present it is not known how much of this variation depends on genetic factors.

H. solitaria appears to have a wide distribution, occurring in Europe, Asia and North America, at least (Dissing 1966a, Kempton & Wells 1970, Weber 1972). I have examined specimens from oroarctic (alpine) conditions in Norway (Harmaja 1977), and Dissing (1966a) reports the species from Iceland and Greenland. In Finland *H. solitaria* is known from a few localities scattered throughout the country.

Helvella confusa Harmaja n.sp.

Helvella confusa Harmaja n. sp. — *Helvellae leucomelaenae valde proxima; ab ea praecipue differt apotheciis minoribus, stipite plerumque plus distincto, hyphis texturae intricatae excipuli angustioribus minus constrictis, et sporis crassioribus (11—15.0 µm).* — *Typus:* Denmark, Jylland, near Thisted, Klitmøller plantage, on calcareous soil, 15.V.1965 K. Toft & H. Dissing (H; isotype C).

As reported above, this new species is based on part of the material treated as *H. solitaria* by Dissing (1966a).

H. confusa is very closely related to *H. leucomelaena,* differing from the latter in: (1) the generally somewhat smaller apothecia, (2) the mostly thinner and more distinct stipe, (3) the hyphae of the *textura intricata* of the excipulum which are narrower (2.0—5.0 µm), especially in the middle and lower part, and only slightly constricted at the septa; the hyphae of *H. leucomelaena* are 2.5—12.0 um in diameter and distinctly constricted at the septa, (4) the slightly thicker wall of the *t. intricata* hyphae, (5) the slightly more differentiated ectal excipulum, (6) the slightly broader asci, (7) the somewhat thicker ascus wall, (8) the somewhat smaller spore length, 18.0—23.0 µm *versus* ca. 20.0—25.0 µm, (9) the somewhat greater spore width, 11.0—15.0 µm *versus* (mostly) 10.5—13.5 µm, and (10) the somewhat later fruiting period. The hyphal and spore characters are the most important ones in routine identification.

The habitats of *H. confusa* and *H. leucomelaena* are very alike. So far, I know *H. confusa* from only four Central European specimens, and its total distribution remains to be clarified. However, its area may be more southern than that of *H. leucomelaena.*

The description of *H. 'solitaria'* in Dissing (1966a) is clearly mainly based on specimen(s) of *H. confusa,* and it may be consulted for a general view of *H. confusa.* The Danish monograph also has a fairly representative photograph of youngish apothecia of the present species belonging to the very large collection which includes the holotype (Fig. 10,

as *H. solitaria*). This photograph may be compared with Fig. 8 in the same monograph, which is a good photograph of typical apothecia of *H. leucomelaena.*

The *t. intricata* hyphae are of the same type as in *H. solitaria,* being fairly conspicuous, densely interwoven, narrow and only slightly constricted (see above).

The asci of *H. confusa* were found aporhynchous, which character was very useful in the separation of the type of *H. solitaria,* with pleurorhynchous asci, from the Danish specimen to become the type of *H. confusa.* Aporhynchous asci are very rare in *Helvella:* Weber (1972) reported that *H. leucomelaena* was the only Michigan species of the genus to have such asci. I have confirmed the existence of this type of asci in the European specimens of *H. leucomelaena* examined for this character. Because of its aporhynchous asci, *H. confusa* is best included in the section *Leucomelaenae* Diss.

H. solitaria may be distinguished from *H. confusa* by the characteristic shape of the apothecium alone (when not too young). Its mature spores are also distinctly smaller, and many submature ones tend to be fusiform and three-guttulate, which character, together with the pleurorhynchous asci, assists in the identification of young or dwarfed apothecia (see above). In addition, the stipe is more distinct in *H. solitaria,* the ectal excipulum is slightly more clearly differentiated, the fruiting period is generally somewhat later, the habitat, although fairly similar, is not exclusively on calcareous soil, and the distribution area is apparently wider, extending to greater latitudes and altitudes.

Specimens examined

Denmark: Jylland, near Thisted, 15.V.1965 K. Toft & H. Dissing, as *H. solitaria* (H; holotype). — **Germany**: Sachsen, "in pinetis 'Neckendorfer Tannen' prope Islebiam" (= near Eisleben?), VII.1879 J. Kunze, as *Acetabula vulgaris* (J. Kunze: Fungi Sel. Exs. no. 297) (H). — **Austria**: Niederösterreich, near Rekawinkel, on roadsides in *Picea abies* forest, V., C. de Keissler, as *Acetabula sulcata* (Krypt. Exs. (Vindobonenses) no. 1825) (H). — **Italy**: Trentino-Alto Adige, on roadside in forest between Paneveggio and Klause, VIII.1884 Arnold & Lojka, as *Acetabula sulcata* (Rehm: Ascomyceten no. 751) (H).

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