

Notes on British species of *Geopora*

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Five species of *Geopora* are recognized from Great Britain. Notes on the nomenclature and taxonomy of these species and of those others in the British checklist are presented and lectotypes for both *Peziza summeriana* and *P. lanuginosa* var. *summeri* are also designated.

Seven species of *Geopora* Harkn., and two species and one variety of the synonym *Sepultaria* (Cooke) Boud. are included in the checklist of British Ascomycotina (Cannon, Hawksworth & Sherwood-Pike, 1985). Investigation of these taxa for the 'Ascomycetes of Great Britain and Ireland' project shows that only five species of *Geopora*, *G. arenicola* (Lév.) Kers, *G. cervina* (Velen.) T. Schumach., *G. foliacea* (Schaeff.) S. Ahmad, *G. summeriana* (Cooke) M. Torre and *G. tenuis* (Fuckel) T. Schumach., can be recognized from British material. Notes on the nomenclature and taxonomy of these species and of the others in the British list are presented here. For synonyms, only those which appear in the British literature are listed, although some recent combinations are included to indicate the taxonomic and nomenclatural history of the taxon concerned.

Geopora arenicola (Lév.) Kers in *Svensk Bot. Tidskr.* **68**: 345 (1974).

Peziza arenicola Lév. in *Ann. Sci. Nat. Bot. sér 3*, **9**: 140 (1848).
Sepultaria arenicola (Lév.) Masee, *Brit. Fung.-Fl.* **4**: 390 (1895).
 There is clearly a varied concept of this species amongst different authors. Some (e.g. Seaver, 1928; Lundell & Nannfeldt, 1941; Kers, 1974) have a broad concept and include a long list of synonyms under this name. However, examination of type or authentic material of some of these suggested synonyms reveals the inclusion of some well separated species, e.g. *Peziza arenosa* Fuckel and *Peziza sepulta* Fr. (see below). Based on the examination of the isotype (*Peziza arenicola* Lév., Bois de Boulogne, K) and some British collections, *G. arenicola* is delimited here as having small subterranean apothecia, with ellipsoid to elongate ellipsoid ascospores $20.0\text{--}25.5\text{--}(26.5) \times (11.5\text{--})12.0\text{--}15.0\ \mu\text{m}$. This species was presented under *Sepultaria arenosa* (Fuckel) Boud. *sensu* Seaver in Dennis (1960, 1978).

Geopora arenosa (Fuckel) S. Ahmad in *Monogr. Biol. Soc. Pakistan* **7**: 176 (1978).

Peziza arenosa Fuckel, *Fungi Rhen. Exsic.* No. 1212 (1865).

Sepultaria arenosa (Fuckel) Rehm in *Rabenh. Krypt.-Fl.* **1**(3): 1077 (1895).

Type material of this species (Fuckel's *Fungi Rhenani exsiccati*, No. 1212, K) has large, ellipso-fusoid ascospores ($27.0\text{--}30.5 \times 13.5\text{--}15.0\ \mu\text{m}$). It should not be regarded as a synonym of *G. arenicola*, though it could prove to be conspecific with the British material named *G. summeriana*. See further discussion under that species below.

Geopora cervina (Velen.) T. Schumach. in *Norwegian J. Bot.* **26**: 55 (1979).

Sepultaria cervina Velen., *Monogr. Discomyc. Bohem.*: 318 (1934).

The British record of this species is based on a herbarium specimen named by T. Schumacher (Ben Hope, W-facing crags, 27 Aug. 1984, B. J. Coppins & O. L. Gilbert, No. 10283, E). Examination of this and an additional collection (unlabelled, E) from Scotland shows it to represent a species distinct from other British *Geopora*, having elongate-ellipsoid to ellipso-fusoid ascospores $21.5\text{--}27.0\text{--}(29.0) \times 10.0\text{--}13.5\ \mu\text{m}$. However, these collections have spores which lack pointed ends and, in this respect, do not agree entirely with the concept of *G. cervina* circumscribed by Schumacher (1979).

Geopora foliacea (Schaeff.) S. Ahmad in *Monogr. Biol. Soc. Pakistan* **7**: 175 (1978).

Elvela foliacea Schaeff., *Fung. Bavar. Palat. Nasc.* **4**: 113, Tab. 319 (1774).

Sepultaria foliacea (Schaeff.) Boud., *Icon. Mycol. Liste Prélim.*: (3) [without pagination] (1904).

The basionym reference for the combination of this species in *Geopora* was given by Ahmad (1978) as ' = *Sepultaria foliacea* Schaeff., *Fung. Tab. CCCIX*; ex Boud., *Icon. Mycol. Tom. II Pl. 359*. – *Hist. Class. Disc. Eur.*: 59. 1907'. This citation is acceptable in view of the ICBN operating at that time, although there are several bibliographic errors. However, the name, *Sepultaria foliacea* (Schaeff.) Boud., does appear on the

plate and page which Ahmad (1978) cited from Boudier's work. The correct bibliographic citation required by the current Code (Greuter *et al.*, 1994) is provided above.

No type or authentic material of this species has been studied in this investigation. We apply this name to British collections having oblong-ellipsoid, often parallel-sided ascospores $(23.0-25.0-27.0(-28.5) \times (11.0-12.0-14.0(-15.0)) \mu\text{m}$.

Examination of an authentic specimen (in Herb. Cooke, K) of *Peziza lanuginosa* Bull. (*Hist. Champ. France*: 260, Pl. 396, Fig. 2 (1791)), listed as a synonym of *Sepultaria foliacea* by Boudier (1904, 1907) and having priority over *Elvela foliacea*, shows it to be referable to *Humaria hemisphaerica* (F. H. Wigg.) Fuckel.

Geopora sepulta (Fr.) Korf & Burds. in Burdsall in *Mycologia* **60**: 500 (1968).

Peziza sepulta Fr. in *Nova Acta Regiae Soc. Sci. Upsaliensis* III, **1**: 230 (1851).

Sepultaria sepulta (Fr.) Masee, *Brit. Fung.-Fl.* **4**: 389 (1895).

Lachnea sepulta (Fr.) W. Phillips, *Man. Brit. Discomyc.*: 209 (1887).

The concept of this species adopted by British authors, with ascospores $22.0-24.0 \times 12.0 \mu\text{m}$ (Cooke, 1876; Phillips, 1887) or $18.0-22.0 \times 10.0-12.0 \mu\text{m}$ (Masee, 1895), is not that represented by material from Fries (Sweden, Horto Upsaliensi, ex Herb. Fries, K). Fries' material has larger, broadly ellipsoid spores $25.0-28.0(-29.5) \times (15.0-16.0-18.0(-19.0)) \mu\text{m}$. Examination of the British specimen cited by Cooke (1876) ('Phillips, E. B. 63', now in K) shows it to be referable to *G. foliacea*. No British material examined has such large and broadly ellipsoid spores as those of the material from Fries. Although it has been regarded as a synonym of *G. arenicola* (Lundell & Nannfeldt, 1941; Kers, 1974; Moreno, Galan & Ortega, 1986; Zhang & Yu, 1992), we consider that *G. sepulta* is an independent species which is not yet known from Britain.

Geopora sumneriana (Cooke) M. Torre in *Anal. Inst. Bot. Cavanilles* **32**(2): 96 (1976).

Peziza sumneriana Cooke, *Mycographia* **1**: 178 (1877) [with description on p. 63 under the name *Peziza (Sarcoscypha) lanuginosa* var. *Sumneri* Berk. & Br. and Fig. 111 under the name *Peziza lanuginosa* Bull. (1876)].

Lachnea sumneriana (Cooke) W. Phillips, *Man. Brit. Discomyc.*: 213 (1887).

Sepultaria sumneriana (Cooke) Masee, *Brit. Fung.-Fl.* **4**: 391 (1895).

Peziza lanuginosa var. *sumneri* Berk. & Broome in Berkeley in *Trans. Linn. Soc. London* **25**: 432, Pl. 55, Fig. 1 (1866).

Sepultaria sumneri (Berk. & Broome) Boud., *Hist. Classific. Discomyc. Europe*: 59 (1907).

This fungus was first named as *Peziza lanuginosa* var. *sumneri* (Berkeley, 1866; Berkeley & Broome, 1866), but renamed as *P. sumneriana* by Cooke (1877), referring to one of his figures of *P. lanuginosa* (Cooke, 1876: Fig. 111) and his previous text for *P. lanuginosa* var. *sumneri* (Cooke, 1876). The varietal name, *P. lanuginosa* var. *sumneri*, has no priority over Cooke's species name (ICBN, Art. 11.2). Later combinations should have cited Cooke (1877) as the reference but all of them cited only Cooke's Fig. 111.

The combination of *Geopora sumneriana* by De La Torre

(1975) may be regarded as invalid due to failure in bibliographic research rather than merely a bibliographic error as considered by Moreno, Galan & Ortega (1986). The basionym reference cited by De La Torre (1975) as '*Peziza lanuginosa* var. *sumneri* Berk. et Br., in *Ann. N.H. núm. 1161, t. 4, f. 25* (1866), *Peziza sumneriana* Cook., in *Mycographia seu Icones Fungorum* vol. 1, p. 63, fig. 111 (1879)' is not simply an error of citation of page number of the publication. The name *Peziza sumneriana* does not appear on the page and the plate he cited. De La Torre (1975) apparently repeated the mistakes made by earlier authors in pre-1953 combinations. If De La Torre missed the correct page in Cooke's work, she should have found this from the *Sylloge Fungorum* (Saccardo, 1889), where '*Lachnea Sumneriana* Cooke Mycogr. f. 111, crf. p. 178 (*Pez.*), *Pez. lanuginosa* var. *Sumneri* Berk. Linn. Trans. XXV, t. 55, f. 1.' was listed. If some fundamental works on fungal taxonomy were not consulted for a new combination it should not be regarded as a bibliographic error.

Sepultaria sumneri (Berk. & Broome) Boud., raising the original varietal epithet, is treated as an independent combination. Boudier listed '*Sepultaria Sumneriana* Cooke' in his *Icones Mycologicae*, Liste Prélim.: (3) [without pagination] (1904), but he used '*Sepultaria Sumneri* (Berk.) Cooke' in the *Texte préliminaire* of the work (Sér. 6, Livr. 26, p. 7 (1909)), the *Provisiores des planches* No. 522 (Tom II, Pl. 358) and the final *Texte descriptif* (Vol. 4: 200 (1910)). The combination in *Icones Mycologicae*, Liste Prélim. repeated Masee's combination, whilst the combination in *Hist. Classific. Discomyc. Europe*: 59 (1907), followed in the later publication of *Icones Mycologicae* can be credited, as a separate combination, to Boudier as he adopted Berkeley & Broome's epithet rather than that of Cooke.

The collections cited for *Peziza lanuginosa* var. *sumneri* by Cooke (1876) (Cooke, F. B. i., 471, ii., 362; Phillips, E. B. 62 and Rabh. F. E. 1419) should be regarded as syntypes of *P. sumneriana*. Cooke *Fungi Britannici exsiccati* 1st ed., No. 471 (Warwick, April 1870, several parts in K) is selected here as the lectotype of *P. sumneriana* as Fig. 111 in *Mycographia* was based on this collection, cited as 'Guy's Cliff, Warwick' in Cooke (1876). The specimen labelled as 'Chiswick House, Mr. Edmonds, May 1866' in Herb. Berkeley (K) is also herewith designated as the lectotype of *P. lanuginosa* var. *sumneri* as it is one of the two collections cited in the protologue. Both of these lectotypes display the same features, having large apothecia 30–70 mm diam. and ellipso-fusoid ascospores $27.0-33.0(-35.5) \times 12.5-15.0(-15.5) \mu\text{m}$. These characters are reminiscent of *G. arenosa* as mentioned above. We do not synonymize these two names because *P. sumneriana* occurs in January to May, often under *Cedrus*, whilst *Geopora arenosa* was described as '*in pinetis*' and '*Autumno*' (Fuckel, 1865, 1866). We prefer to continue using the well established name in British literature for this fungus pending further investigation.

Geopora tenuis (Fuckel) T. Schumach. in *Norwegian J. Bot.* **26**: 56 (1979).

Humaria tenuis Fuckel in *Jb. nassau. Ver-Naturk.* **23-24**: 322 (1870).

Peziza tenuis (Fuckel) Cooke in *Grevillea* **3**: 73, Fig. 97 (1874).

Sepultaria tenuis (Fuckel) Boud., *Icon. Mycol.*, Liste Prélim.: (3) [without pagination] (1904).

The lectotype of this species designated by Schumacher (1979) is in fact the holotype as only one collection ('F. rh. 2289') was mentioned in the protologue. The concept of Dennis (1960, 1978) for this species is followed here but with longer apothecial hairs than those described from the type (Schumacher, 1979). The example of Fuckel's *Fungi Rhenani* No. 2289 in K is exhausted and no other authentic material of this species has been seen by the present authors.

Sepultaria arenicola var. *bloxamii* (Cooke) Boud., *Hist. Classific. Discomyc. Europe*: 59 (1907).

Peziza arenosa var. *bloxamii* Cooke, *Mycographia* 1: 68, Fig. 121 (1876) [as '*bloxami*'].

Lachnea arenicola var. *bloxamii* (Cooke) W. Phillips, *Man. Brit. Discomyc.*: 211 (1887) [as '*bloxami*'].

Examination of the type of this taxon labelled '*Peziza sepulta*, Liverpool' in K shows it to have ellipsoid to elongate-ellipsoid ascospores 22.0–25.5(–27.0) × 13.0–15.0 µm. We agree with Masee (1895) that this is a synonym of *G. arenicola*.

Boudier (1907) referred his combination to Cooke's *Mycographia* Fig. 121, but also erroneously to Saccardo's *Syll. Fung.* 11: 393, where *Geopyxis bloxamii* [as '*bloxami*'] Masee (*Grevillea* 22: 98, 1894) was listed. Masee's species, from Oxford (Baxter), on the ground, was described without any connection with Cooke's fungus which was from near Liverpool, amongst sand.

Sepultaria geaster (Berk. & Broome) Boud., *Hist. Class. Discomyc. Europe*: 59 (1907).

Peziza geaster Berk. & Broome in *Ann. Mag. Nat. Hist. Ser. 3*, 7: 449 (1861), non Rabenhorst (1867).

Lachnea geaster (Berk. & Broome) W. Phillips, *Man. Brit. Discomyc.*: 210 (1887).

The holotype material, labelled as '*Peziza geaster* B. & B., Wentworth, Oct. 9 1858', in K, displays ellipsoid to elongate ellipsoid ascospores 22.0–25.5 × 13.0–14.5 µm, and represents *G. arenicola*. We agree with Lundell & Nannfeldt (1941) and with Kers (1974), who treated *P. geaster* as a synonym of *G. arenicola*. It may be noted that this taxon was published as a new species twice by the same authors (Berkeley & Broome, 1861, 1866).

Sepultaria semiimmersa (P. Karst.) Masee, *Brit. Fung. -Fl.* 4: 391 (1895).

Peziza semiimmersa P. Karst., *Not. Fauna Fl. Fenn.* 10: 117 (1869).

Humaria semiimmersa (P. Karst.) Sacc., *Syll. Fung.* 8: 143 (1889).

Leucoscypha semiimmersa (P. Karst.) Svrček in *Ceská Mykol.* 28: 133 (1974).

Octospora semiimmersa (P. Karst.) K. B. Khare & V. P. Tewari in *Can. J. Bot.* 56: 2118 (21 Sept. 1978).

Octospora semiimmersa (P. Karst.) S. Ahmad, *Monogr. Biol. Soc. Pakistan* 7: 183 (1978).

Byssonectria semiimmersa (P. Karst.) Benkert in *Gleditschia* 15: 181 (1987).

This is a reddish species, out of place in *Geopora*. It appears to be congeneric with *Peziza patavina* Cooke, and further investigation is required to establish an appropriate generic placement for these two species.

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