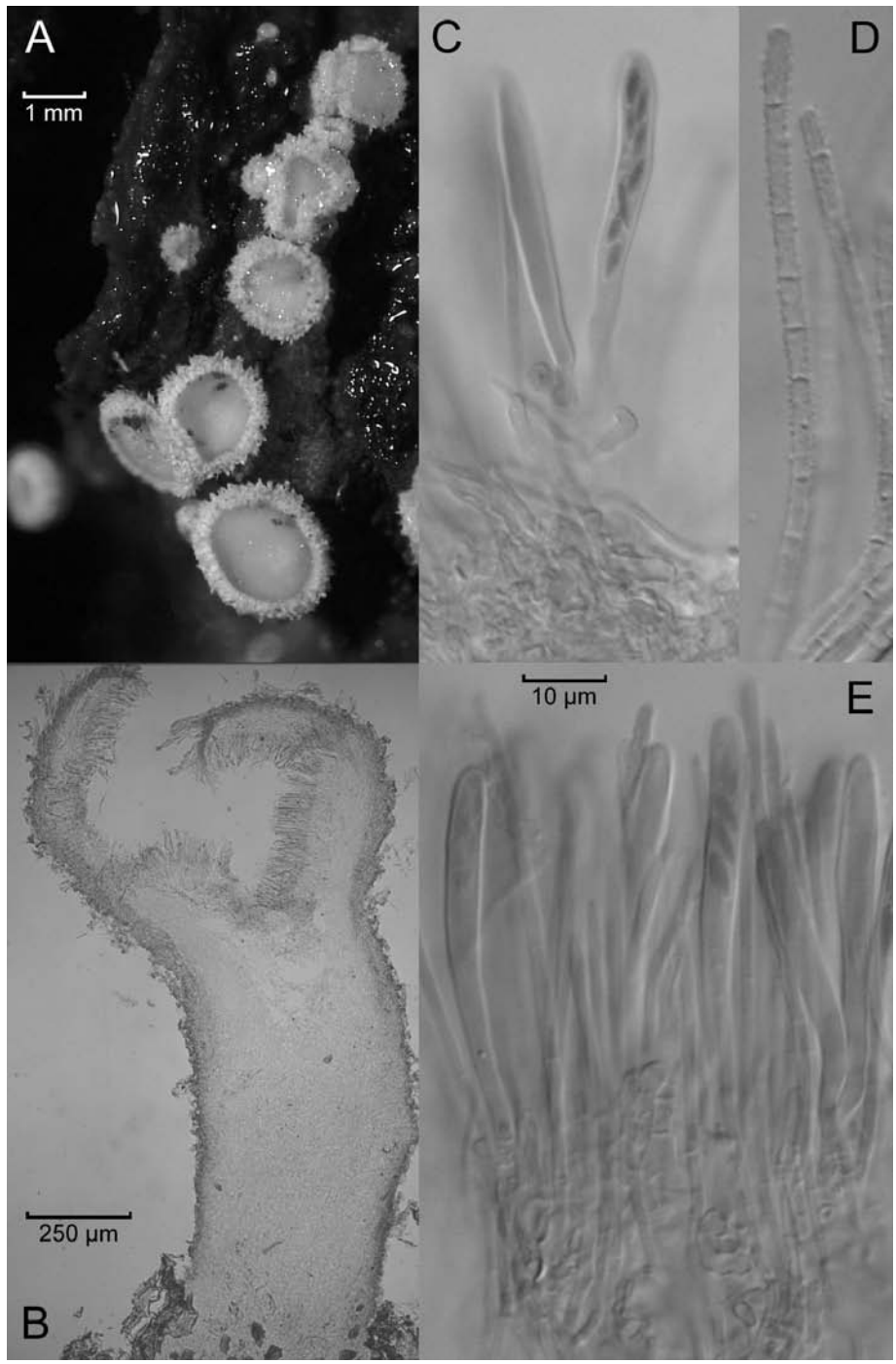

A. Ascomata on dead twig of *Pinus sylvestris*. **B**. Ascoma in vertical transverse section. **C**. Asci and ascospores. **D**. Ascomatal hairs. **E**. Hymenium with asci, ascospores and paraphyses. [**C–E** at same magnification; all material from **IMI** 236744.]

Lachnellula subtilissima (Cooke) Dennis, *Persoonia* **2**(2): 184 (1962).

Peziza calycina Schumach., *Enumeratio Plantarum* in Partibus Sællandiae Septentrionalis et Orientalis Crescentium **2**: 424 (1803).

Dasyscyphus calycinus (Schumach.) Fuckel, *Jahrbücher des Nassauischen Vereins für Naturkunde* **23–24**: 305 (1869, publ. 1870) [as '*Dasyscypha*'].

Trichoscypha calycina (Schumach.) Boud., *Bulletin de la Société Mycologique de France* **1**: 117 (1885).

Helotium calycinum (Schumach.) P. Karst., *Bidrag till Kännedom af Finlands Natur och Folk* **19**: 154 (1887).

Trichoscyphella calycina (Schumach.) Nannf., *Nova Acta Regiae Societatis Scientiarum Upsaliensis* Series 4, **8**(1.2): 299 (1932).

Peziza subtilissima Cooke, *Grevillea* **3**(no. 27): 121, fig. 167 (1875).

Lachnella subtilissima (Cooke) W. Phillips, *A Manual of the British Discomycetes*: 244 (1887).

Dasyscyphus subtilissimus (Cooke) Sacc., *Sylloge Fungorum* **8**: 438 (1889) [as '*Dasyscypha*'].

Trichoscypha subtilissima (Cooke) Boud., *Histoire et Classification des Discomycètes d'Europe*: 125 (1907).

Naemaspora strobi Allesch., *Hedwigia* **34**: 279 (1895) [anamorph].

Habit occurring singly or in clusters, breaking out from bark of dead twigs and small branches, often on detached fallen brashing trash or branches broken by wind or snow, usually not buried but rather on upper surfaces, sometimes also on dead cones and needles or on cankers of living trees. *Conidiomata* often overlooked, light-coloured, compact, ± globose, later developing into teleomorph initials, producing conidia within pale yellow to orange-yellow labyrinthiform cavities. *Conidiophores* colourless, thin-walled, smooth, verticillately branched. *Conidiogenous cells* colourless, thin-walled, smooth, subulate, 10–15 × 1·5 µm, producing conidia by non-progressive replacement wall-building apex 'phialide' development. *Conidia* colourless, aseptate, thin-walled, smooth, ellipsoidal or fusiform, 2–4·5 × 1–1·5 µm. *Ascomata* generally bright and rather conspicuous, apothecial, with white flanks, when young curled up, becoming cup-shaped and, finally, curled up when dry but opening widely in humid conditions to expose yellow or orange-yellow concave saucer-shaped hymenial surface, circular when viewed from above, 1–4 mm diam., short-stalked when viewed from side, with white excipulum covered in conspicuous white hairs that later sometimes become greyish or slightly yellowish. *In mid-point vertical section* ectal excipulum composed of compactly arranged hyphal cells forming *textura prismatica* or *textura oblita*, medullary excipulum composed of loosely woven thin-walled hyphae forming *textura intricata*. *Hairs* colourless, with finely granulated surface, septate, cylindrical, 4–5 µm wide. *Asci* containing eight ascospores arranged in single row, with only one visible wall layer, thin-walled, cylindrical, rounded at apex, tapering gradually towards base, 45–65 × 4–7 µm, with apex turning blue in iodine, opening by small apical pore. *Ascospores* colourless, smooth, aseptate, fusiform-clavate, 6–11 × 2–2·5 µm. *Paraphyses* colourless, smooth, septate, cylindrical, unbranched, slightly wider towards apex, a little longer than asci, 50–75 × 1–2·5 µm, containing yellow to yellowish-orange globules.

DISEASE: WEISSENBERG (1975) reported that this species caused minor damage to *Pinus contorta* plantations in Finland. SHARMA, THIND & SHARMA (1980) and SHARMA (1986) reported that it causes cankers on conifers at high altitudes in the Himalaya, and provided a map of its distribution in India. There are a few other records of ascomata observed on moribund twigs or cankers. It is, however, generally regarded as a saprobe, with almost all observations as fruitbodies erumpent from cones or bark of dead twigs and small branches, and occasionally leaves, in late spring or early summer and throughout the year where the climate is mild and moist.

HOSTS: *Abies alba*, *A. balsamea*, *A. cephalonica*, *A. holophylla*, *A. pectinata*, *A. pindrow*, *Abies* sp.; *Cedrus* sp.; *Larix decidua*, *L. europaea*, *L. kaempferi*, *L. laricina*, *L. leptolepis*, *L. occidentalis*, *Larix* × *eurolepis*, *Larix* sp.; *Picea abies*, *P. excelsa*, *P. mariana*, *P. morinda*, *P. sitchensis*, *Picea* sp.; *Pinus banksiana*, *P. cembra*, *P. densiflora*, *P. excelsa*, *P. montana*, *P. monticola*, *P. mugo*, *P. mugo* var. *rostrata*, *P. murrayana*, *P. nigra*, *P. nigra* var. *maritima*, *P. occidentalis*, *P. pinaster*, *P. ponderosa*, *P. pumila*, *P. radiata*, *P. strobus*, *P. sylvestris*, *P. taeda*, *P. thunbergii*, *P. tuberculata*, *Pinus* sp.;

Pseudotsuga menziesii, *P. taxifolia*; *Tsuga mertensiana* (*Pinaceae*). Other associated organisms observed: *Cronartium ribicola*; *Didymella* sp.; *Phacidium lacerum*.

GEOGRAPHICAL DISTRIBUTION: NORTH AMERICA: Canada (Alberta, British Columbia, Newfoundland, Ontario, Québec), USA (California, Colorado, Connecticut, Idaho, Maine, Massachusetts, Michigan, Montana, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, South Carolina, Texas, Vermont, Washington, Wyoming). CENTRAL AMERICA: Dominican Republic. SOUTH AMERICA: Chile. ASIA: Georgia, India, Japan, Pakistan, Russia (Primorskyi krai), South Korea. AUSTRALASIA: New Zealand. EUROPE: Austria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Romania, Russia (Leningradskaya oblast), Slovakia, Spain, Sweden, Switzerland. Highest recorded altitude: 1800 m.

PHYSIOLOGICAL SPECIALIZATION: None reported.

TRANSMISSION: Not known, but presumably by wind-dispersed ascospores. OGUCHI (1981) noted that conidia germinate on malt extract agar, suggesting that they too may have a dispersal function. OGUCHI also provided descriptions of the appearance of isolates in pure culture.

NOTES: Macroscopically, all white-haired species of *Lachnellula* tend to look alike, and a confident identification can only be made by microscopic examination. The combination of white hairs and fusiform ascospores measuring 6–11 × 2–2·5 µm distinguishes this species from other members of the genus occurring on *Coniferales*. Many colour photographs of ascomata of this species can be found in popular treatments of the fungi, including BREITENBACH & KRÄNZLIN (1984, photo 235, p. 201) and JORDAN (1995, photo 063.2). DHARNE (1965) reported that the fungus can be isolated into pure culture and, on 2% malt extract agar, forms cottony white mycelium, producing the anamorph *in vitro* after a few days. OGUCHI (1981) was also able to isolate pure cultures of the fungus and to obtain the anamorph *in vitro*, but observed that, in Japan, the anamorph was not seen *in vivo*. Although the epithet '*calycina* Schum.' antedates the epithet '*subtillisima* Cooke' by many years, DENNIS (1962) has correctly pointed out that it cannot be used since the combination *Lachnellula calycina* (Vuill.) Sacc. [*Sylloge Fungorum* **8**: 391 (1889)], based on a different type specimen, already exists. This species was included in a review of polyploidy in discomycetes (WEBER & BRESINSKY, 1992).

Lachnellula subtilissima is known mainly from some northern hemisphere mountainous, temperate or boreal areas, universally on *Pinaceae* (it has not been possible to verify one record on *Quercus* from Italy). In Europe it is clearly widespread and there are many records (though some under the epithet '*calycina*' may represent misidentifications). It is not included in lists of fungi from the Atlas Mountains of Africa, and there seem to be no records from mountainous regions of Afghanistan, Bhutan, Iran, Iraq, Kazakhstan, Kirgizstan, Mongolia, Nepal, Tadzhikistan, Turkey or Uzbekistan. There is one literature record of it from the Caribbean (CIFERRI, 1961), for which the author has not seen any specimen. Despite looking for it on several visits to Cuba, the author has never seen it there. Given the generally north temperate to boreal character of the genus and the fact that there are no other tropical records, that report may merit further verification. *Lachnellula subtilissima* has also apparently not been recorded on native or introduced pines from Central America, México, the southern USA or tropical Asia, although it has been recorded as an exotic introduction to Chile and New Zealand.

The conservation status of this species has never been assessed, but it has been described as common in the former Czechoslovakia (MINTER, 1981) and the UK (ELLIS & ELLIS, 1985), and there is no evidence of any change in its distribution or frequency of occurrence. Its distribution, restricted to mountainous, temperate or boreal areas, from which some adaptation to cold may be inferred, may make it vulnerable to climate change. Where it has been introduced inadvertently as an exotic, there is no evidence of it being a problem.

In addition to cited literature and internet sources, the information in this description sheet is derived from specimens in the **IMI** and **K** fungal reference collections and the author's computerized database of around 800,000 records of fungi and other organisms.

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See also the following internet sites:

www.hfri.bibai.hokkaido.jp/kanko/kenpo/pdf/kenpo19-9.PDF [description, distribution, hosts, illustration]
www.micologica-barakaldo.org/pdffiles/muskaria2003.pdf [distribution]
www.cybertruffle.org.uk/pics/0001314_.htm [illustration]
www.fontiquer.org/modules.php?name=coppermine&file=displayimage&album=211&cat=0&pos=2 [illustration]

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