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Kalchbrenneriella, A New Genus to Accommodate the Lichenicolous Hyphomycete *Torula cyanescens*

PAUL DIEDERICH
Musée national d'histoire naturelle, 25 rue Munster, L-2160 Luxembourg, Luxembourg

Abstract. *The new genus* Kachbrenneriella *Diederich & M. S. Christ. is described to accommodate the lichenicolous hyphomycete* Torula cyanescens *Kalchbr., and the new combination* K. cyanescens *(Kalchbr.) Diederich & M. S. Christ. is proposed. As the type specimen is considered to be lost, a neotype is designated. The fungus forms a whitish tomentum on* Usnea *thalli, composed of erect conidiophores on which hyaline, catenate conidia develop, and is known from Europe, Canada, and Papua New Guinea.*

Within a survey of Hungarian fungi, Kalchbrenner (1865) described the new lichenicolous hyphomycete *Torula cyanescens* Kalchbr., growing on '*Usnea barbata* var. *dasypoga*'. The original description is very short: '*Ferme microscopica! Sporidiis 3–10 subhyalinis, sphaeroideis, in fila erecta, brevia, moniliformia plerumque simplicia compaginatis, hyphas non vidi.*' Three conidiophores were depicted by Kalchbrenner (1865, pl. II, fig. 10) (Fig. 1). The species was later reported from Denmark by Lind (1913), but the corresponding specimen does not belong to *Torula cyanescens* (see below). Keissler (1930) incorrectly considered the name as a synonym of *Coniothyrium usneae* (Anzi) Vouaux, a fungus now known as *Lichenoconium usneae* (Anzi) D. Hawksw., and he believed that the illustrated conidiophores represented only a sterile mycelium of the *Lichenoconium*. Hawksworth (1977*a*, 1979) did not trace any type material and no fungus similar to that described by Kalchbrenner was available to him.

In 1987, M. Skytte Christiansen showed me a Danish collection of what appeared to be *Torula cyanescens*. More specimens later became available from Europe, Canada, and Papua New Guinea. The species clearly does not belong to the genus *Torula*, nor is there any other generic name available to accommodate the fungus. Therefore we describe a new genus for it. My friend, the late M. Skytte Christiansen was the first to rediscover *Torula cyanescens*. He suggested the new generic name *Kalchbrenneriella*. I consider it as appropriate to associate him as a co-author of the new genus and of the new combination given below.

MATERIAL AND METHODS

Specimens examined are kept in BM, C, E, LG, NY, and UBC, and in the private collections of P. Diederich, J. Etayo, and P. van den Boom. Microscopic examinations of hand-made and microtome sections were examined in water (including all measurements and drawings), KOH, and lactophenol cotton blue at a magnification of ×1,000.

KALCHBRENNERIELLA Diederich & M. S. Christ., *gen. nov.*

Genus incertae sedis. Coloniae tomentum densum album supra hospitis thallum formantes. Mycelium immersum, hyalinum, ramosum. Conidiophora semi-macronemata, erecta, recta, superficialia praeter cellulam basalem, non vel raro apicaliter ramosa, hyalina, rugosa. Cellulae conidiogenae monoblasticae, terminales, subcylindricae ad ellipsoideae, hyalinae. Conidia catenata, acrogena, subcylindrica ad ellipsoidea, aseptata, rugosa, hyalina.

TYPE SPECIES: *Kalchbrenneriella cyanescens* (Kalchbr.) Diederich & M. S. Christ.

KALCHBRENNERIELLA CYANESCENS (Kalchbr.) Diederich & M. S. Christ., *comb. nov.* FIG. 2

Torula cyanescens Kalchbr., Mat. természettud. Közlem. 3: 296. 1865. TYPE: HUNGARY. 'déli Szep. Hebrich erdöben Sz. Ol. mellet' [Szepes Hebrich adjoining Szepes Olaszi forest], on '*Usnea barbata* var. *dasypoga*', *Kalchbrenner* (type considered to be lost: B-, BP-, *fide* Hawksworth 1979: 286). NEOTYPE: ITALY. Trentino-Alto Adige, Prov. Bolzano, 54 km WSW of Merano, Nat. Park Stilfser Joch, road Prad-Stilfserjoch, SW of Trafoi, on *Picea*, on *Usnea* sp., VIII.1990, *P. van den Boom 10867* (LG, neotype, here designated; hb. van den Boom, hb. Diederich, hb. Etayo, isoneotypes). Isoneotypes will be distributed in Santesson *Fungi Lichenicoli Exsiccati*.

Oospora cyanescens (Kalchbr.) Sacc. & Voglino in Saccardo, Syll. Fung. 4: 25. 1886.

Colonies forming a dense, continuous, whitish tomentum over host thallus. *Mycelium* penetrating into host cortex and medulla, hyaline, branched, individual cells 7–12 × 1.5–3.0 μm. *Conidiophores* semi-macronematous, erect, straight, superficial, except lower cell that is immersed in host cortex, often branched, hyaline, rugose, 3–5-celled, 15–22 μm long, 2.5–4.0 μm thick; cell wall 0.5–0.8 μm thick. *Conidiogenous cells* monoblastic, rarely lat-

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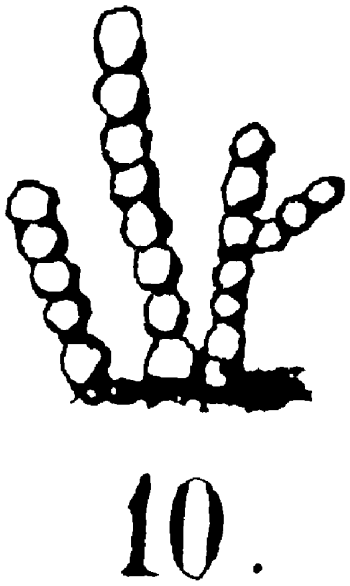

FIGURE 1. Original illustration of *Torula cyanescens* Kalchbr. (Kalchbrenner 1865, pl. II, fig. 10).

erally producing second conidium, terminal, subcylindric to ellipsoid, hyaline, terminal cells sometimes conidiogenous. *Conidia* arising in acropetal chains, acrogenous, breaking off only with difficulty, subcylindric to ellipsoid, aseptate, with thick, rugose wall (± smooth in KOH), pale grayish (hyaline in KOH), 5.5–7.0 × 3–4 μm.

Distribution and hosts.—The species is presently known from Europe (Denmark, Hungary, Ireland, Italy, and Scotland), North America (Canada), and Australasia (Papua New Guinea), and it appears to be cosmopolitan. All known specimens are from *Usnea* thalli, including *Usnea flammea*, *U. glabrescens* agg., and *U. subfloridana*, which are not damaged by the presence of the fungus. The relatively small number of specimens available to me is surely partly due to the very inconspicuous appearance of the fungus that can easily be overlooked, even by experienced lichenologists. On the other hand, the species is certainly rare, as no additional specimens were found in the very abundant *Usnea* material with lichenicolous fungi examined by me during the past 15 yr.

Discussion.—*Torula cyanescens* can be distinguished from the genus *Torula* (Pers.) Link, the species of which all have brown, often septate conidia and very characteristic conidiogenous cells that are determinate, usually spherical, and sometimes become cupulate (Ellis 1971). No other hyphomycete genus illustrated by Carmichael et al. (1980) fits *Torula cyanescens*, and the description of a new genus *Kalchbrenneriella* is therefore appropriate. Similar genera are *Hormomyces* Bonord., a basidiomycetous anamorph forming sporodochia-like conidiomata, *Monilia* Pers., *Hyalodendron* Diddens, and *Sphaeridium* Fresen., which are all distinguished by strongly branched conidiophores and smooth conidia.

Kalchbrenneriella cyanescens is easily recognized by the general aspect of infected *Usnea* thalli. These appear as mat, whitish (not bluish, as the epithet *cyanescens* might suggest), almost pruinose, and only at a high magnification can the dense tomentum formed by the conidiophores be recognized. It cannot be confused with any other known lichenicolous hyphomycete with hyaline conidia, although the conidiophores of *Refractohilum* D. Hawksw. and *Hawksworthiana peltigericola* (D. Hawksw.) U. Braun, often developing over gall-like swellings of their hosts, might be superficially similar when observed with a dissecting microscope. The conidia in all these species are, however, different (Braun 1988; Hawksworth 1977*b*).

One of the specimens examined (*Diederich 8315*) is furthermore attacked by an unidentified *Nectria s.lat.* species, resembling *Nectria erubescens* (Desm.) W. Phillips & Plowr. It has superficial, dark reddish brown perithecia without hairs and 3-septate ascospores of 9.0–11.5 × 2.0–2.5 μm, easily breaking into two 1-septate part spores. Although the perithecia are predominantly present in parts of the *Usnea* thallus in which *Kalchbrenneriella cyanescens* is scarce, it cannot be ruled out that *K. cyanescens* is an anamorph of the *Nectria*. More collections, culture experiments, and molecular studies are necessary to give a more definite answer to this question.

Lind (1913) reported the discovery of *Oospora cyanescens* in Denmark. The late M. Skytte Christiansen received the corresponding specimen in 1991 from the herbarium of E. Rostrup, which is now kept in CP. Following Christiansen (1991, pers. comm.), the specimen consists of tiny yellow granules growing on decaying wood. These granules are apparently dessicated colonies of a yeast-like fungus with multipolar budding. There was no trace of a mycelium or a pseudomycelium. One microscopic slide prepared by Christiansen is kept in hb. Diederich. This specimen clearly does not belong to *Kalchbrenneriella cyanescens*.

Additional specimens examined.—CANADA. BRITISH COLUMBIA. Alberta, Banff Nat. Park, Tunnel Mtn, 51°11′ N; 115°33′ W, on *Usnea glabrescens* agg., 1984, *Goward 84-1248* (UBC). DENMARK. N JUTLAND. Tværsted, dunes NW of Frederikshavn, on *U. subfloridana*, 1968, *Christiansen 5966* (C, hb. Diederich). GREAT BRITAIN. V. C. 101, KINTYRE. Knapdale, Loch Coille-Bharr, on W side of loch, on *U. flammea*, 2001, *Coppins* (E, hb. Diederich); Knapdale, Loch Sween, peninsular on W side of Port Lunna, on *U. flammea*, 2001, *Coppins* (E, hb. Diederich). V. C. 104, NORTH EBUDES. Isle of Skye, SSE Broadford, Ard-

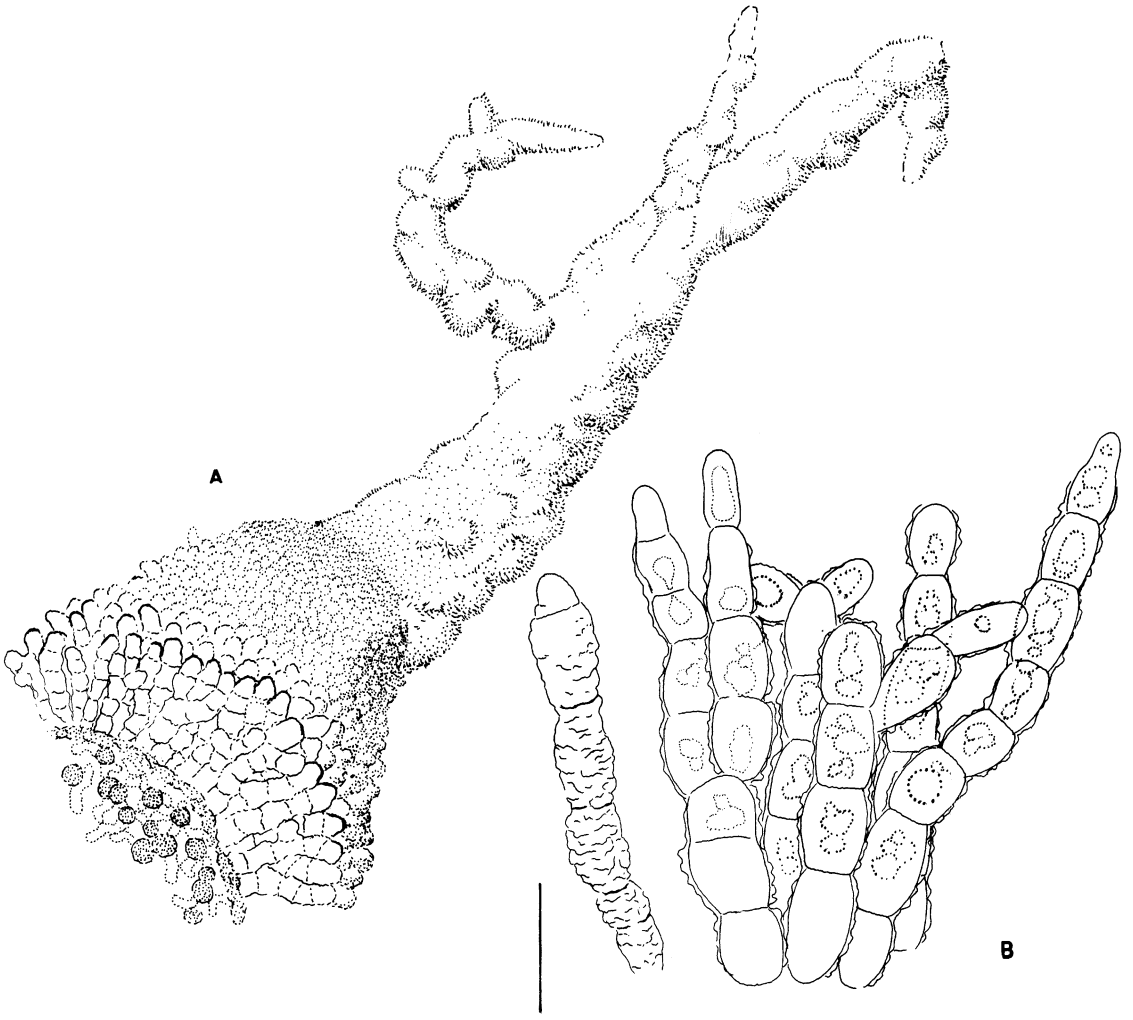

FIGURE 2. *Kalchbrenneriella cyanescens* (neotype). — A. Infected *Usnea* thallus at varying magnification. — B. Conidiophores and conidia, examined in water; scale = 10 μm. Del. J. Etayo.

nameacan, on *U. flammea*, 1987, *Diederich 8315, 8316* (NY, hb. Diederich). V. C. 110, OUTER HEBRIDES. Isle of Lewis, Lews castle woods and grounds along Stornoway harbour, on *U. subfloridana*, 1959, *Manning* (E). IRELAND. V. C. H16, WEST GALWAY. Connemara, Toombeola, Angles' Return, on *U. flammea*, 1979, *Richardson* (E). PAPUA NEW GUINEA. EASTERN HIGHLANDS. SE of Goroka towards Lufa, near Litipinaga, 1,700 m, on *Usnea* sp., 1987, *Lambley 1101*(a) (BM, hb. Diederich).

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LITERATURE CITED

BRAUN, U. 1988. Studies on *Ramularia* and allied genera (I). International Journal of Mycology and Lichenology 3: 271–285.

CARMICHAEL, J. W., W. B. KENDRICK, I. L. CONNERS & L. SIGLER. 1980. Genera of Hyphomycetes. The University of Alberta Press, Edmonton, AB.

ELLIS, M. B. 1971. Dematiaceous Hyphomycetes. Commonwealth Mycological Institute, Kew.

HAWKSWORTH, D. L. 1977*a*. Taxonomic and biological observations on the genus *Lichenoconium* (Sphaeropsidales). Persoonia 9: 159–198.

———. 1977*b*. Three new genera of lichenicolous fungi. Botanical Journal of the Linnean Society 75: 195–209.

———. 1979. The lichenicolous Hyphomycetes. Bulletin of the British Museum (Natural History), Botany series 6: 183–300.

KALCHBRENNER, K. 1865. XIII. A Szepesi gombák jegyzéke. Némi tekintettel oly fajokra is, melyek Magyarhon más részeiben észleltettek. I. Mathematikai és Ter-

mészettudományi Közlemények Vonatkozólag a Hazai Viszonyokra 3: 192–319.

KEISSLER, K. VON. 1930. Die Flechtenparasiten. In Dr. L. Rabenhorst's Kryptogamen-Flora 8: xi + 712 pp. Akademische Verlagsgesellschaft, Leipzig.

LIND, J. 1913. Danish fungi as represented in the herbarium of E. Rostrup. Gyldendalske Boghandel-Nordisk Forlag, Copenhagen.

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