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SHORT COMMUNICATION

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Cylindrosporella on betulaceous trees in Japan

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Abstract Three *Cylindrosporella* species on the leaves of betulaceous trees – *C. carpini*, *C. coryli*, and *C. microsperma* – were first reported from Japan. The genus *Cylindrosporella* is sometimes treated as congeneric with *Asteroma*; however, we considered these to differ based on conidial morphology following the concept of Arx. The genus *Cylindrosporella* is characterized by one-celled, filiform or fusiform, small conidia that are often curved, have hyaline, thin walls, and are produced from phialidic conidiogenous cells in subcuticular, flat acervuli. The three species are distinguished from each other on the basis of conidium size.

Key words *Asteroma* · Betulaceae · Coelomycetes · Taxonomy

Cylindrosporella Höhn. (Coelomycetes) was established in 1916 based on *C. carpini* (Lib.) Höhn. on *Carpinus betulus* L. This genus is characterized by one-celled, filiform or fusiform, small conidia that are often curved, have hyaline, thin walls, and are produced from phialidic conidiogenous cells in subcuticular, flat acervuli on host leaves. The basal stratum of the acervuli is thin, brownish, and composed of pseudoparenchymatous tissues.

Arx (1970) accepted 13 species in the genus, including species formerly placed in *Actinonemella* Höhn. and *Asteroma* DC. ex St. Amans. In the comprehensive study on Coelomycetes, however, Sutton (1980) reduced *Cylindrosporella* and *Actinonemella* to synonymy with *Asteroma* because *Asteroma* was the earliest generic name for the species formerly placed in *Cylindrosporella* and *Actinonemella* and some other related genera. *Asteroma* was typified by *A. padi* DC.:Fr. on *Prunus padus* L. Sutton (1980) accepted 13 species in the genus. Subsequently, Arx (1981) accepted the *Asteroma*, but it contained only 2 species including *A. padi*, and other species formerly placed in *Asteroma* were included in *Cylindrosporella*. In his concept, the *Asteroma* has ellipsoidal conidia in contrast to the spermatium-like filiform or fusiform ones of *Cylindrosporella*. The difference between *Asteroma* and *Cylindrosporella* seems to be not so great. However, the filiform or fusiform conidial shape of *Cylindrosporella* is a characteristic feature. Therefore, we followed Arx's (1981) concept for the generic delimitation of *Cylindrosporella* in the present paper. The teleomorphs of the genus are known as *Gnomonia*, *Gnomoniella*, and other Diaporthaceae (Arx 1981).

As regards to Japanese *Cylindrosporella* or *Asteroma* species on trees, two *Asteroma* species have been reported: *Asteroma alneum* (Pers.: Fr.) Sutton and *A. coryli* (Fuckel) Sutton (Katumoto 1992). However, no exact record of *A. coryli* exists (Katumoto, personal communication). Recently, we have collected several *Cylindrosporella* species inhabiting the leaves of some betulaceous trees. Furthermore, when we examined several specimens deposited in our mycological herbarium (TFM:FPH), some of those were regarded as *Cylindrosporella*: these are "*Leptostroma* sp." on *Carpinus* (Horie et al. 1975) and on *Corylus* (Horie and Kobayashi 1983). These fungi were known as the cause of "susumon-byo" of *Carpinus* and *Corylus*, respectively.

In this article, the morphological characteristics of three *Cylindrosporella* species parasitic on betulaceous trees are described and some taxonomic discussions of these are made.

Cylindrosporella carpini (Lib.) Höhn., Sber. Akad. Wiss. Wien 125:96, 1916. Figs. 1–4

Basyonyms: *Leptothyrium carpini* Lib., Pl. Crypt. Ard. 3: no. 256, 1834; *Gloeosporium carpini* (Lib.) Desm., Ann. Sci. Nat., ser. 3, 20:214, 1853; *Asteroma carpini* (Lib.) Sutton, The Coelomycetes: 496, 1980.

Acervuli produced in grayish-brown to brown, circular, or irregular shaped lesions on both leaf surfaces, particu-

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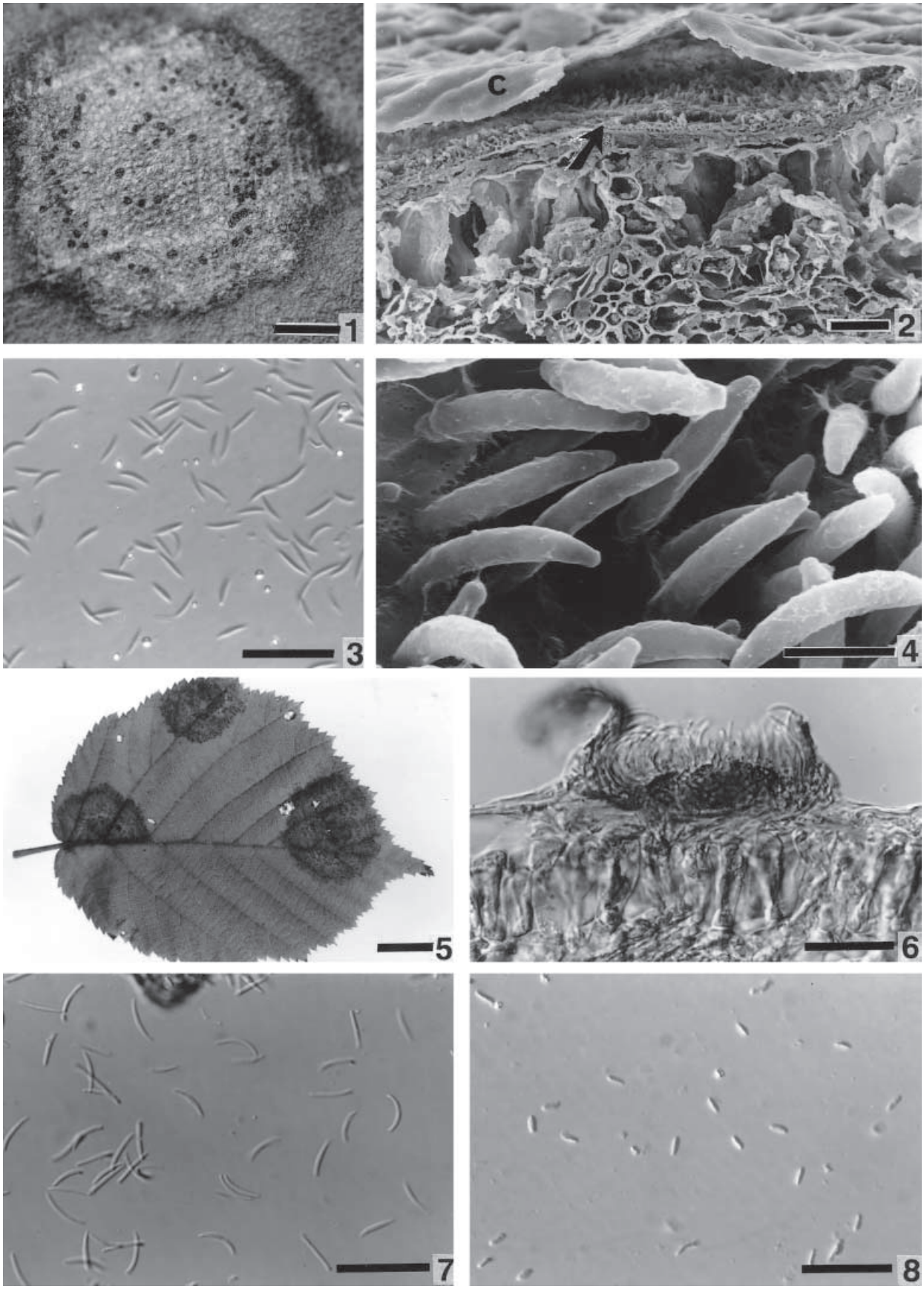

Figs. 1–4. *Cylindrosporella carpini* on *Carpinus tschonoskii.* **1** Acervuli in a lesion. **2** Vertical section of acervulus (*arrow*) produced under cuticle of host (*C*) (SEM). **3** Conidia. **4** Conidia produced from conidiogenous cells (SEM). *Bars* **1** 2 min; **2** 20 μm; **3** 20 μm; **4** 5 μm

Figs. 5–7. *Cylindrosporella coryli* on *Corylus sieboldiana.* **5** Lesions with minute acervuli. **6** Vertical section of acervulus. **7** Conidia. *Bars* **5** 1 cm; **6** 20 μm; **7** 20 μm

Fig. 8. Conidia of *Cylindrosporella microsperma* on *Betula ermanii*. *Bar* 20 μm

larly on upper side, circularly gregarious, subcuticular, flat, dark brown, 55–200 μm in diameter, composed of pale yellowish-brown textura angularis. Conidiogenous cells densely crowded at the base of acervuli, phialidic, ampulliform, hyaline, 4–6 × 2–4 μm. Conidia hyaline, thin-walled, filiform, or fusiform, often curved, 7–12 × 1–1.5 μm.

Specimens examined (all specimens are deposited in TFM:FPH): On *Carpinus cordata* Blume (Sawashiba): Ogawa, Ibaraki, S. Kaneko (S.K.), 7510. On *Carpinus tschonoskii* Maxim. (Inushide): Kohriyama, Fukushima, T. Kobayashi (T.K.), 4323; Mt. Tsukuba, Ibaraki, T.K., 5046; Arboretum of Forestry & Forest Products Res. Inst. (FFPRI), Ibaraki, T.K., 5488; Todori, Hachiohji, T.K. & M. Kusunoki (M.K.), 5360; M.K., 6173; Jindai Bot. Park, Chofu, T.K., 4324; K. Sasaki, 4795; Kozakai, Shimane, Y. Suto, 4322. On *C. laxiflora* (Sieb. & Zucc.) Blume (Akashide): Ogawa, Ibaraki, S.K., 7512; Arboretum of FFPRI, Ibaraki, Y. Kawashima, 7157. On *Ostrya japonica* Sarg. (Asada): Ogawa, Ibaraki, S.K., 7511.

Remarks: Horie et al. (1975) reported a leaf spot disease (susumon-byo) that occurred on *Carpinus tschonoskii,* and they tentatively identified the causal fungus as *Discophoma* sp.; then, the genus name was altered to *Leptostroma* sp. (Horie et al. 1977). We examined their specimens deposited in TFM:FPH. *Leptostroma* Fr:Fr. resembles *Cylindrosporella* and *Asteroma* in general features. However, the acervuli of *Leptostroma* are covered with a shining upper wall, and the conidiogenous cells are sympodial in contrast to the phialidic nature of *Cylindrosporella* and *Asteroma* (Sutton 1980). Consequently, the specimens were identified as *C. carpini.* It was also confirmed by examining European specimens on *Carpinus betulus* (IMI 21699 and 21700).

The lesions produced on *Carpinus tschonoskii* are larger and more conspicuous in color than those on other host plants.

As described above, this species is conspecific with the pathogen of the "susumon-byo." We propose the English disease name "sooty leaf spot" for the "susumon-byo."

Cylindrosporella coryli (Fuckel) von Arx, Genera of Fungi Sporurating in Pure Culture, 3rd edn.: 220, 1981.

Figs. 5–7

Basyonyms: *Leptothyrium coryli* Fuckel, Jb. Nassau. Ver. Naturk. 23–24:120, 1870; *Asteroma coryli* (Fuckel) Sutton, The Coelomycetes: 496, 1980.

Acervuli produced in brown, circular lesions, circularly gregarious, on both leaf surfaces, subcuticular, flat, dark brown, 60–150 μm in diameter, composed of pale yellowish-brown textura angularis. Conidiogenous cells densely crowded at the base of acervuli, phialidic, ampulliform, hyaline, 5–9 × 2–3.5 μm. Conidia hyaline, thin-walled, filiform or fusiform, often curved, 5–16 × 1–1.5 μm.

Specimens examined: On *Corylus heterophylla* Fischer ex Besser var. *thunbergii* Blume (Hashibami): Bot. Garden, Nat. Sci. Mus., Tsukuba, S.K., 7509. On *C. sieboldiana* Blume (Tsunohashibami): Bot. Garden, Nat. Sci. Mus., Tsukuba, S.K., 7519.

Remarks: Horie and Kobayashi (1983) reported a leaf spot disease "susumon-byo" of *Corylus heterophylla* var. *thunbergii*, and they tentatively identified the causal fungus as *Leptostroma* sp. As in the case of *C. carpini*, the fungal species was reidentified as *C. coryli* in the present study. It was also confirmed by examining European specimens on *Corylus avellana* (IMI 30692 and 54500).

General conidial feature of *C. coryli* resembles to that of *C. carpini*, but the conidial size of *C. coryli* is distinctly longer than *C. carpini*.

We propose the English disease name "sooty leaf spot" for the "susumon-byo."

On *Corylus*, an acervulous fungus *Monostichella coryli* (Desm.) Höhn. was recorded (Horie and Kobayashi 1983). The *Monostichella* species often occurs on the same leaves together with *C. coryli*. However, *M. coryli* is easily distinguished from *C. coryli* by the ellipsoid or obovoid shape of conidia.

Cylindrosporella microsperma (Pk) Petrak, Ann. Mycol. 22:42, 1924. Fig. 8

Basyonyms: *Asteroma microspermum* (Pk) Sutton, The Coelomycetes: 496, 1980; *Septoria microsperma* Pk, 34th Rep. N.Y. St. Mus. 44, 1883.

Acervuli produced in circular lesions, mostly on upper leaf surfaces, subcuticular, flat, brown, 70–180 μm in diameter, composed of pale yellowish-brown textura angularis. Conidiogenous cells densely crowded at the base of acervuli, phialidic, ampulliform, hyaline, 4–6 × 2–3 μm. Conidia hyaline, thin-walled, filiform or fusiform, often curved, 5–8 × 1.5–2 μm.

Specimens examined: On *Betula ermanii* Cham. (Dakekamba): Mt. Nishihotaka, Nagano, S.K., 7513. On *B. pendula* Roth (Seiyoshirakamba): Tokyo Agric. Exp. Sta, Tachikawa, T.K. & H. Horie, 5120.

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