

SHORT COMMUNICATION

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New species of the genus *Scolecostigmina* and revision of *Cercospora cryptomeriicola* on conifers

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Abstract *Scolecostigmina chibaensis* on *Pinus parviflora* is described as a new species. *Cercospora cryptomeriicola* Sawada on *Cryptomeria japonica* is transferred to the genus *Pseudocercospora*, based on the morphological characteristics of the type specimen and newly collected specimens.

Key words *Cryptomeria japonica* · *Pinus parviflora* · *Pseudocercospora cryptomeriicola* comb. nov. · *Scolecostigmina chibaensis* sp. nov.

In Japan, conifer diseases are studied carefully because of the national economic importance of these tree species. However, despite the numerous studies, new diseases or diseases that are not very well studied do exist, and these need prompt investigation.

Scab canker of *Pinus parviflora*

Pinus parviflora (“Himekomatsu” in Japanese) is one of the threatened tree species in Boso Peninsula, Japan. In Chiba Prefecture, trees of *Pinus parviflora* were observed to have diseased and collapsed twigs caused by scab canker. Similar symptoms were noted on seedlings nearby, which finally

resulted in the death of the seedlings. Although this disease was first reported in 2001 (Suzuki et al. 2001), the causal agent remains unknown. In 2002, the authors detected a fungus on the canker, which was suspected to be the pathogen based on the results of inoculation tests with an isolated fungus (data not shown). Based on the assumption that the disease on the twig was caused by the fungus on *P. parviflora*, the authors examined the specimens to reveal its taxonomic position.

Scolecostigmina chibaensis C. Nakash., Tak. Kobay. & Tosh. Yamada, sp. nov. Figs. 1, 3–7

Maculis in caulis vivis formatis, rimosis, gibbis; stromatibus caulivoris, nullis vel paucibus, atro-brunneis, erumpentibus, 2–13 µm in diametro; conidiophoris solitariis vel dense fasciculatis, rectis, atro-brunneis vel olivaceo-brunneis, multi-septatis, 30–60 × 4–8 µm, proliferatione percurrentibus; conidiis solitariis, rare catenatis, phragmo- et scolecosporis, verrucatis, saepe rostratis, atro-brunneis, leviter curvatis, ad apicem obtusis, ad basim truncatis vel obconicis, 5–13-septatis, 65–136 × 9–13 µm.

Etymology: *chibaensis*, referring to the name of collecting site, Chiba Prefecture.

Type specimen: On *Pinus parviflora* Siebold & Zucc. (Pinaceae), University Forest in Chiba, The University of Tokyo, Kiyosumi, Kamogawa, Chiba, Japan, May 19, 2006, by Toshihiro Yamada (holotype, Herbarium of Forest Mycology and Pathology, Forestry and Forest Products Research Institute, TFM: TPH-7858; isotype, Mie University Mycological Herbarium, MUMH 10314) (ex-type culture: NBRC 102148).

Symptoms on twig: swelling, finally cracking. Stromata lacking or small, blackish-brown to black, erumpent, 2–13 µm in diameter. Conidophores solitary to densely fasciculate, straight, blackish-brown to olivaceous brown, multiseptate, percurrently proliferating, 30–60 × 4–8 µm. Conidia solitary, occasionally chained, blackish-brown, phragmo- to scolecosporous, thick walled, verrucate, truncate and thin at basal end, often rostrate, obtuse at tip, 65–136 × 9–13 µm, with 5–13 euseptate.

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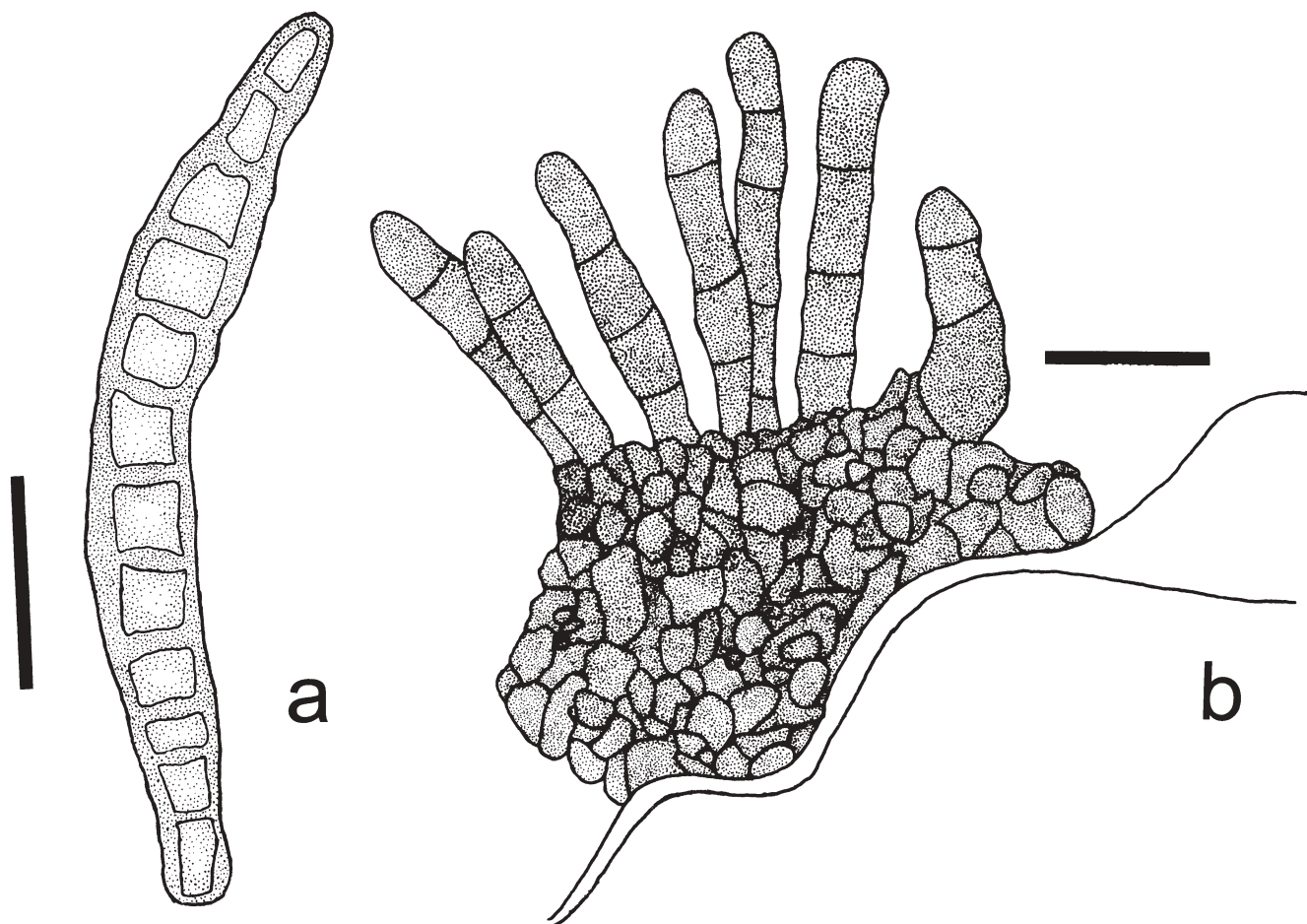


Fig. 1. *Scolecostigmia chibaensis*. a Conidium. b Stroma and conidiophores. Bars 20 μ m

Host plants: *Pinus ayacahuite* Ehrenb. ex Schltdl., *P. parviflora* Siebold & Zucc., *P. parviflora* Siebold & Zucc. var. *pentaphylla* Henry (“Kita-goyo”), *P. peuce* Griseb. (“Makedonia-goyo”), *P. strobiformis* Engelm. (“Mekishiko-shiromatsu”), *P. wallichiana* A.B. Jacks. (“Himaraya-goyo”), *P. strobus* L. (“Sutorobu-matsu”), *Pinus* sp.

Additional specimens examined: *Pinus ayacahuite*: Kamigamo Exp. Stn., Field Sci. Educ. & Res. Ctr., Kyoto Univ., Kamigamo, Kita-ku, Kyoto, Japan, August 13, 2003, by Toshihiro Yamada (T.Y.) (MUMH 10323).

Pinus parviflora: University Forest in Chiba, The University of Tokyo (UFCUT), Kimitsu, Chiba, Japan, May 28, 2004, by T.Y. & Chiharu Nakashima (C.N.) (MUMH 10001, 10439); *ibid.*, May 16, 2006, by T.Y. (MUMH 10325); *ibid.*, May 19, 2006, by T.Y. (MUMH 10314, 10315); *ibid.*, Maezawa, Kamogawa, Chiba, May 16, 2005, by T.Y. (MUMH 10023); *ibid.*, May 19, 2006, by T.Y. (MUMH 10316, 10317); Kamigamo Exp. Stn., Field Sci. Educ. & Res. Ctr., Kyoto Univ., Kamigamo, Kita-ku, Kyoto, Japan, August 13, 2003, by T.Y. (MUMH 10322).

Pinus strobus: UFCUT, Maezawa, Kimitsu, Chiba, Japan, March 4, 2004, by T.Y. (MUMH 10318).

Pinus parviflora var. *pentaphylla*: Nanairi, Hinoe, Fukushima, Japan, July 29, 2004, by T.Y. (MUMH 10320);

Funamata, Hinoe, Fukushima, Japan, July 29, 2004, by T.Y. (MUMH 10319).

Pinus peuce: Kamigamo Exp. Stn., Field Sci. Educ. & Res. Ctr., Kyoto Univ., Kamigamo, Kita-ku, Kyoto, Japan, August 13, 2003, by T.Y. (MUMH 10321).

Pinus sp.: Kamigamo Exp. Stn., Field Sci. Educ. & Res. Ctr., Kyoto Univ., Kamigamo, Kita-ku, Kyoto, Japan, August 13, 2003, by T.Y. (MUMH 10324).

Disease name: Scab canker (“Kasabuta ganshu byo” in Japanese).

Distribution: Known only in Japan.

Note: Based on the morphological characteristics of the present fungus, it was suggested to belong to the genus *Scolecostigmia*. The genus *Scolecostigmia* U. Braun (Braun et al. 1999) was established for *Stigmia*-like (*Stigmia* sensu lato) hyphomycetes of *Mycosphaerella* anamorphs with phragmo- to scolecosporous and predominantly transverse euseptate and thick-walled conidia (Braun 1999). *Scolecostigmia* species of fungi are typically foliicolous. For the caulicolous *Stigmia*-like hyphomycetes, the genus *Thyrostroma* Höhn. with pulvinate sporodochia and non-scolecosporous, muriform, and euseptate conidia (Sutton and Pascoe 1989) is considered more appropriate. The fungus on *P. parviflora*, however, differs from the genus

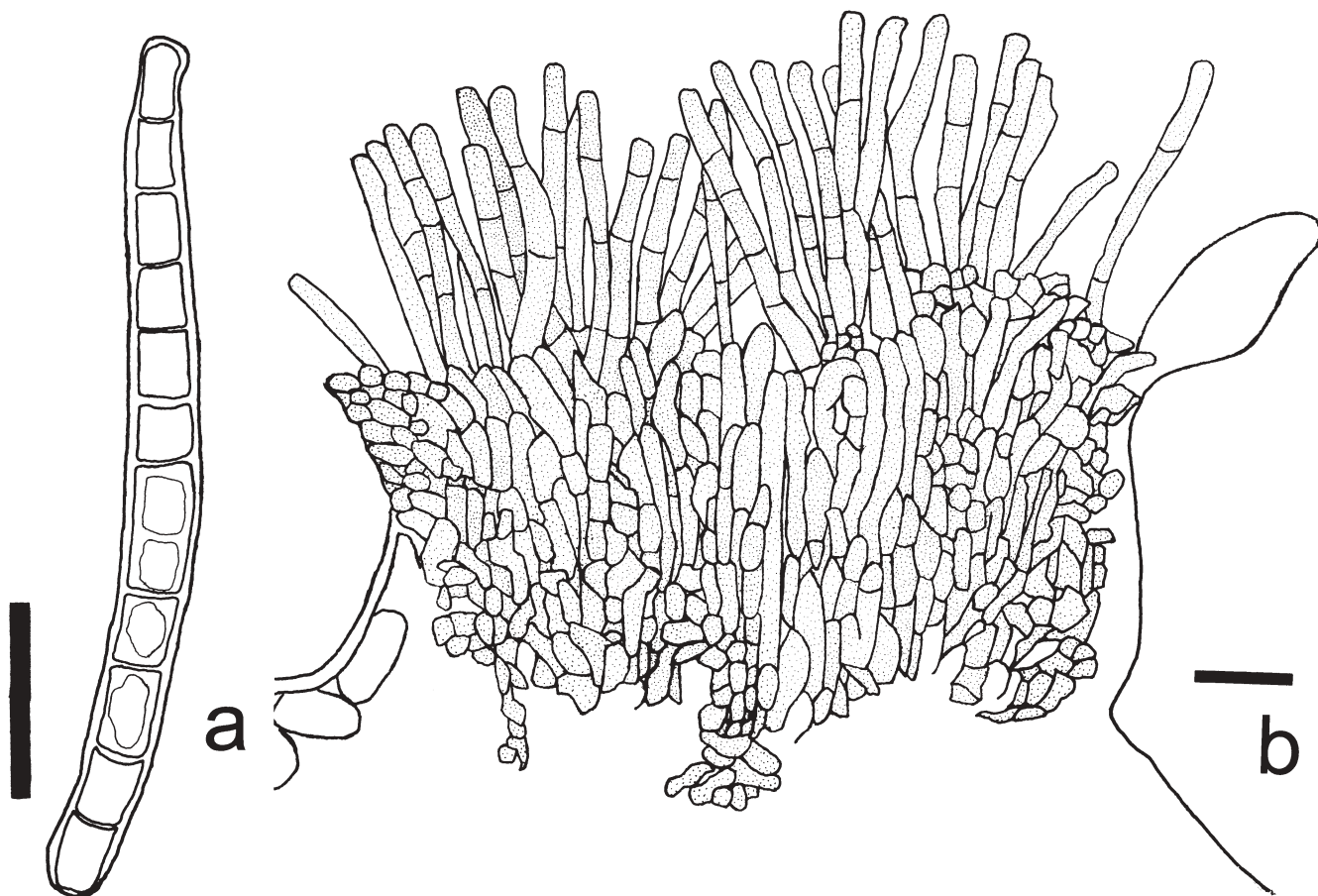


Fig. 2. *Pseudocercospora cryptomericola*. a Conidium. b Stroma and conidiophores. Bars 20µm

Thyrostroma in forming phragmo- to scolecosporous and transversely euseptate conidia in addition to small and distinct stromata. *Lecanostictopsis* species are also known as *Stigmina*-like fungi with identical conidiogenesis (Sutton and Crous 1997). However, this genus differs from that of the fungus on *P. parviflora* in that the latter shows phragmo- to scolecosporous conidia. Moreover, the size of conidiomata, number of septations, and the shape of conidia of the present fungus differ from hitherto known species of *Stigmina* sensu lato. Therefore, based on the morphological characteristics, the fungus on the twig of *P. parviflora* was identified as a caulicolous new species of *Scolecostigmia*.

The phylogenetic relationships of *Stigmina* sensu lato including *Lecanostictopsis*, *Scolecostigmia*, *Stigmina* sensu stricto, and *Thyrostroma* at the genus and species level have not yet been revealed. A more detailed examination using a large number of samples will be necessary for this purpose.

Black line needle blight of *Cryptomeria japonica*

The needle disease, "Retsuibo" disease on needles, of *Cryptomeria japonica* D. Don (Taxodiaceae) caused by

Fig. 3. Fruit bodies on symptom on *Pinus parviflora* twig

Fig. 4. Vertical section of fruit bodies of *Scolecostigmia chibaensis* on *P. parviflora*; stromata and conidiophores. Bar 10µm

Fig. 5. Phragmo- to scolecosporous conidium of *S. chibaensis* having verrucate surface. Bar 20µm

Fig. 6. Scanning electron micrograph (SEM) of fruit bodies of *S. chibaensis* on *P. parviflora* twig (15 kV, osmium single fixation)

Fig. 7. SEM of conidia and conidiophores of *S. chibaensis* on *P. parviflora*. Conidogenous cell shows percurrent proliferation on conidiophores (arrows)

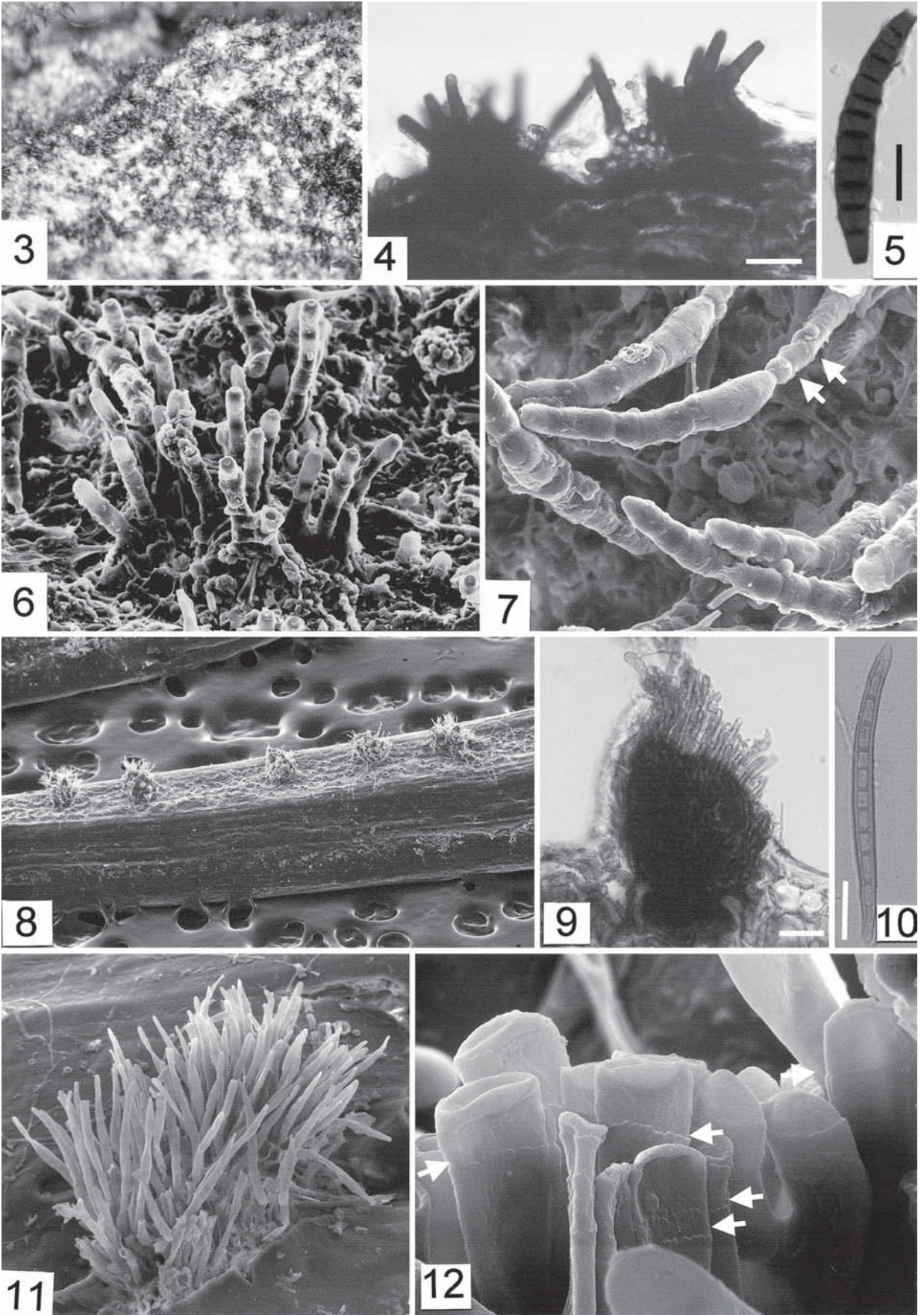
Fig. 8. SEM of fruit bodies of *Pseudocercospora cryptomericola* on *Cryptomeria japonica* needle (15 kV, osmium single fixation). Fungal masses consisting of conidiophores and conidia form a line on the needle

Fig. 9. Vertical section of fruit bodies of *P. cryptomericola* on *C. japonica* needle; erumpent stroma and conidiophores. Bar 10µm

Fig. 10. Conidium of *P. cryptomericola* having thickened conidial wall and pseudo-septa. Bar 10µm

Fig. 11. SEM of conidia and erumpent conidiophores of *P. cryptomericola* on *C. japonica* (15 kV, osmium single fixation)

Fig. 12. SEM of conidiophores of *P. cryptomericola* (15 kV, osmium single fixation). Conidogenous cells show percurrent proliferation on conidiophores (arrows)



Cercospora cryptomeriicola Sawada was first described by Sawada (Sawada 1950). Since then, only a few specimens of this disease have been collected throughout Japan, so the disease was not well known compared to the more prominent needle blights caused by *Cercospora sequoiae* Ellis & Everh. (= *Passalora sequoiae* [Ellis & Everh.] Y.L. Guo & W.H. Hsieh). *Cryptomeria japonica* plants diseased by *C. cryptomeriicola* were detected in Kumamoto Prefecture in 2002.

Based on the new generic concepts (Braun 1995, 1998; Crous and Braun 2003), a worldwide taxonomic reexamination of *Cercospora* and the allied genera has been performed. In view of these revisions of *Cercospora* and the allied genera, the authors evaluate the taxonomic position of the *C. cryptomeriicola* and transfer the species to the genus *Pseudocercospora* Speg.

Pseudocercospora cryptomeriicola (Sawada) C. Nakash., Akashi & Akiba, comb. nov. Figs. 2, 8–12

≡ *Cercospora cryptomeriicola* Sawada, Bull. Gov. For. Exp. Stn. 45: 53, 1950. [*cryptomeriicola*]

≡ *Distocercospora cryptomeriicola* (Sawada) Akashi., C. Nakash. & Tak. Kobay., Abstr. Jpn. For. Soc. 117, 2006 (only from electronic device, nom. inval., ICBN Art. 29.1).

Needle spots distinct, yellow to brown, enlarged whole needle. Small fungal masses consisting of olivaceous conidiophores and conidia are in a line from the base to the tip of browned needles. Stromata erumpent, dark olivaceous brown to black, subglobose, 89–276 µm in diameter. Conidiophores loose to dense fasciculate, dark brown to black, straight to slightly sinuous, with unthickened conidial scars, 1–7 septate, percurrently proliferate, 51–86 × 3–4.8 µm. Conidia holoblastic, slightly curved, cylindrical to obclavate, with thickened conidial wall, pale brown to brown, truncate and unthickened at the basal end, rounded at tip, 7–11 septate, occasionally forming pseudo-septa, 53–79 × 4.9–7.8 µm.

Host: *Cryptomeria japonica* D. Don. (Taxodiaceae).

Disease name: Black line needle blight (“Retsu-iboby,” Sawada 1950)

Specimens examined: Kamabuchi, Yamagata, Japan, August 8, 1949, by Sato (type specimen of *Cercospora cryptomeriicola* Sawada; preserved in Herbarium of Museum of Iwate University); Furikusa, Kitashidara, Aichi, Japan, June, 1954, by Iwao Ando (TFM: FPH-1085); Kamifuchi, Mugi, Gifu, Japan, June 9, 1954, by Syozo Takai (TFM: FPH-1088); Kikuchi valley, Kikuchi, Kumamoto (33°07.5′N, 130°57′8.5″E), Japan, June 1, 2004, by C.N. & Mitsuteru Akiba (M.A.) (TFM: FPH-7850); *ibid.*, October 7, 2005, by Tadashi Akashi, C.N., & M.A. (TFM: FPH-7851); Nangou, Miyazaki, Japan, June 14, 2002, by Takayoshi Sanui.

Distribution: Known only from Japan.

Deposited cultures: NBRC 102149 (isolated from TFM: FPH-7850), NBRC 102150 (TFM: FPH-7851)

Notes: The fungus from these specimens occasionally forms distoseptate conidia, which is one of the most important characteristics for the genus *Distocercospora* Pons &

B. Sutton (Pons and Sutton 1988). The genus *Pseudocercospora* that belongs to “*Cercospora* and allied genera” also forms distoseptate conidia but only occasionally (Crous and Braun 2003). However, the morphological characteristics of the specimens including type materials, i.e., well-developed stromata, unthickened conidial scars and hilum, and pigmented conidia, indicate that *C. cryptomeriicola* should be transferred to the genus *Pseudocercospora* rather than the genus *Distocercospora*. In our preliminary examination of phylogenetic study with rDNA internal transcribed spacer (ITS) regions by comparing with published phylogenetic data of *Mycosphaerella* and its anamorphs (Crous et al. 2001; Braun et al. 2003; Verkley et al. 2004), the fungus *Pseudocercospora cryptomeriicola* (DDBJ accession no. AB277789, AB27790) was clustered with *Pseudocercospora* species in the clade of the genus *Mycosphaerella* (data not shown). This result also supports the need for transferring the present species to the genus *Pseudocercospora*.

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