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Addition and reexamination of Japanese species belonging to the genus *Cercospora* and allied genera. VI. Four *Pseudocercospora* species from Ohshima Island, Tokyo

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Abstract Four fungi belonging to the genus *Pseudocercospora* were collected from Ohshima Island, which has commonly been called Izu-ohshima, Tokyo. Among them, two on *Helwingia japonica* and on *Stachyurus praecox* var. *matsuzakii* are recognized as new species, and named *P. izuohshimensis* and *P. hachijokibushi*, respectively. *Styrax japonica* var. *jippeii-kawamurae* was newly added to the host list of *P. fukuokaensis*. Presence of *P. myrticola* in Japan was reconfirmed in examining a fresh diseased material on *Myrtus communis*.

Key words Izu-ohshima · New species · *Pseudocercospora hachijokibushi* · *Pseudocercospora izuohshimensis*

Introduction

Ohshima (Izu-ohshima) is the largest of the Izu-Islands, located at 139°23' E and 35°18' N and 120 km south from metropolitan Tokyo, Japan. It has 91.06 km² in total area, and the volcanic mountain Mihara rises 755 m from sea level. The second author stayed for 2 years, from April 2000 to March 2002, at the Ohshima Horticultural Research Center, Tokyo Metropolitan Agricultural Experiment Station, Ohshima Island, Tokyo, and collected many plant disease materials caused by fungi.

In this article, four interesting fungi belonging to the genus *Pseudocercospora* are selected and reported. They

consist of two new species, one found on a new host, and one for which distribution in Japan is confirmed.

Description

1. *Pseudocercospora izuohshimensis* C. Nakashima, H. Horie et Tak. Kobayashi, sp. nov.

Figs. 1, 5, 9, 10

Previous record: *Cercospora* sp. On *Helwingia* sensu Horie and Kobayashi (1984).

Maculis in foliis vivis clare griseo-brunneis vel atro-brunneis, interdum indistinctis, margine obscuris, orbiculatis vel irregularibus, 3–20 mm diam.; stromatibus claris, praecipue epiphyllis, interdum amphigenis, pallide brunneis vel viridi-brunneis, 24–36 μm diam.; hyphis externis raro formantibus; conidiophoris pallide brunneis, dense fasciculatis, simplicibus, rectis vel parum curvatis, cicatricibus indistinctis praeditis, 0–1-septatis, 28–63 × 2.4–4.3 μm; conidiis pallidis vel pallide olivaceis, erectis vel curvatis, 1–13-septatis, 28–111 × 2.4–3.6 μm, ad basim truncatis et non incrassatis, ad apicem obtusis, laevis.

Type specimen: On *Helwingia japonica* (Thunb. ex Murray) F.G. Dietr. (Japanese name: Hanaikada); Senzu, Ohshima-machi, Ohshima Island, Tokyo, Sept. 24, 2001, by Hiromichi Horie (HH) (TFM: FPH-7618).

Leaf spots distinct, grayish-brown to dark brown, sometimes indistinct, subcircular to irregular, 3–20 mm in diameter. Stromata distinct, usually epiphyllous, sometimes amphigenous, intra- or subepidermal, then erumpent, greenish-brown to olive-brown, 24–36 μm in diameter. External mycelia rarely formed. Conidiophores emerging from the upper part of stromata, greenish brown, densely fasciculate, simple, straight or slightly curved, 0–1-septate, 28–63 × 2.4–4.3 μm, with indistinct and unthickened conidial scars. Conidia cylindrical, straight or curved, pale to pale olive, with truncate and unthickened basal end, dull or obconical tip, 1–13-septate, 28–111 × 2.4–3.6 μm in size, 42 × 2.8 μm on average, smooth.

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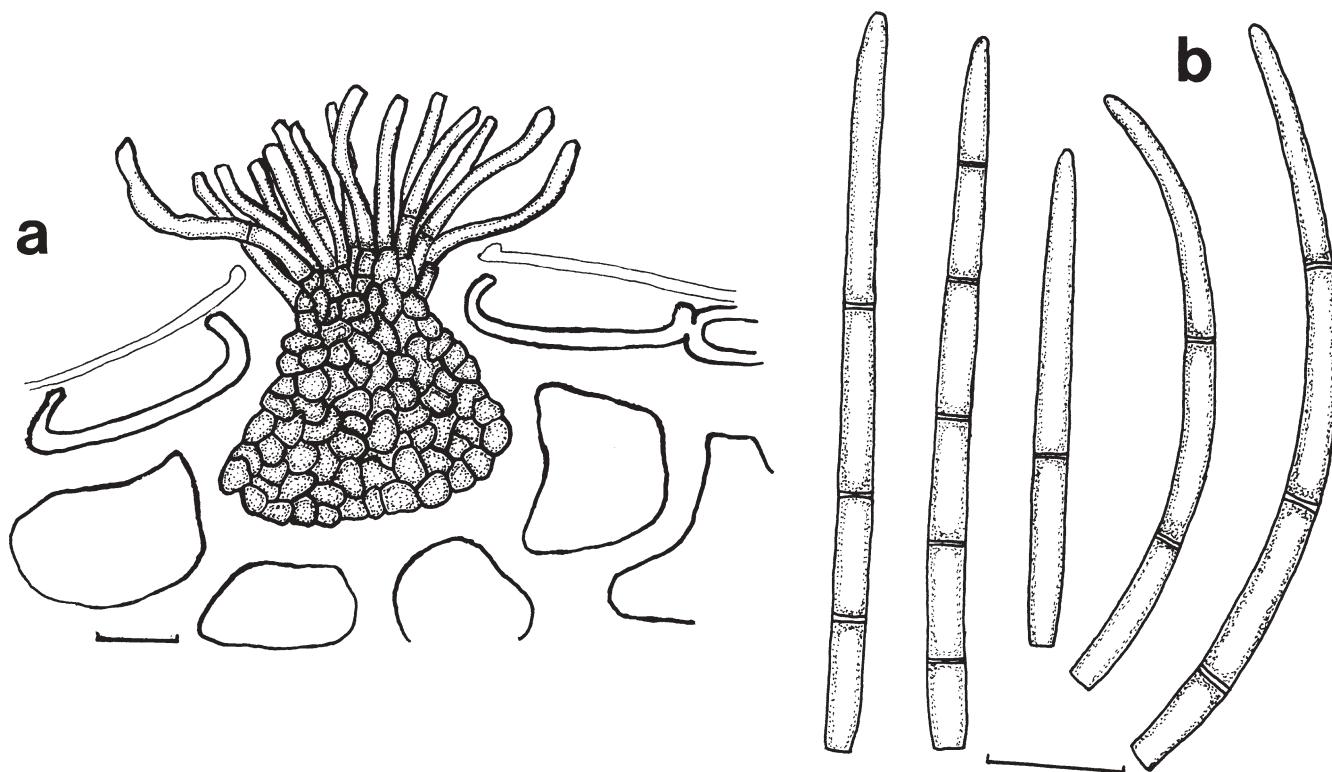


Fig. 1. *Pseudocercospora izuohshimensis*. a Stroma and conidiophores. b Conidia. Bar 10 μ m

Disease name: Leaf spot (Hanten-byo in Japanese; Horie and Kobayashi 1984).

Additional specimens examined: Diseased leaves of *Helwingia japonica*; Asakawa Exp. For., Gov. For. Exp. Sta., Hachioji, Tokyo, Oct. 12, 1979, by T. Kobayashi (TK) (TFM: FPH-6153, as *Cercospora* sp.); Higashiyama Bot. Park, Nagoya, Aichi Pref., Nov. 6, 1982, by HH (TFM: FPH-5617, as *Cercospora* sp.).

Note: The species of *Cercospora* and its allied genera are usually considered to be host specific. In other words, each host genus is equal to one fungal species of *Cercospora* and its allied genera. On *Helwingia* plants, no species of the genus *Cercospora* and allied genera has been known. However, two specimens of diseased *Helwingia* leaves, besides the type specimen from Ohshima Island, have been kept at the Forest Pathology Herbarium (TFM: FPH) of Forestry and Forest Products Research Institute (FFPRI), Tsukuba, Japan. Fungus on them was treated tentatively as *Cercospora* sp. (Horie and Kobayashi 1984). Disease symptoms and morphological characteristics of the causal fungi on two preserved specimens were quite identical with those of the type specimen newly collected. From these facts, fungi recognized on these specimens were thought to be the same species belonging to the genus *Pseudocercospora* and treated as a new species, *P. izuohshimensis*.

2. *Pseudocercospora hachijokibushi* C. Nakashima, H. Horie et Tak. Kobayashi, sp. nov.

Figs. 2, 6, 11, 12

Maculis in foliis vivis numerosis, dispersis, brunneis vel atro-brunneis, ad marginem distinctis, angularibus vel irregularibus, raro foratis, 2–5 mm diam.; stromatibus distinctis, amphigenis, intra-vel subepidermalibus, brunneis, 19–36 μ m diam.; conidiophoris pallide brunneis, synnematosides vel caespitosis, simplicibus, geniculatis, cicatricibus distinctis praeditis, 28–63 \times 2.4–3.6 μ m; conidiis cylindricis vel obclavatis, pallidis vel pallide olivaceis, ractis vel curvatis, raro sigmoideis, 57–103 \times 2.4–4.3 μ m, ad basim truncatis et non incrassatis, ad apicem obtusis, laevis.

Holotypus: on *Stachyurus praecox* var. *matsuzakii* (Nakai) Makino (Japanese name: Hachijo-kibushi); Senzu, Ohshima-machi, Tokyo, Oct. 26, 2001, by HH (TFM: FPH-7619).

Leaf spot numerous, scattered, brown to dark brown with distinct border, angular to irregular, occasionally shot-holed, 2–5 mm in diameter. Stromata amphigenous, intra- or subepidermal, then erumpent, brown, parenchymatous, 19–36 μ m in diameter. Conidiophores synnematosous or caespitose, simple, geniculate, pale brown, with distinct and unthickened or denticulate conidial scars, 28–63 \times 2.4–3.6 μ m. Conidia cylindrical to obclavate, straight or curved, occasionally sigmoid, with truncate and unthickened basal end, and with obconical tip, 57–103 \times 2.4–4.3 μ m, 76 \times 3 μ m on average, smooth.

Disease name: Brown leaf spot (Kappan-byo in Japanese).

Note: As described above, the present fungus surely belongs to the genus *Pseudocercospora*. On the host genus

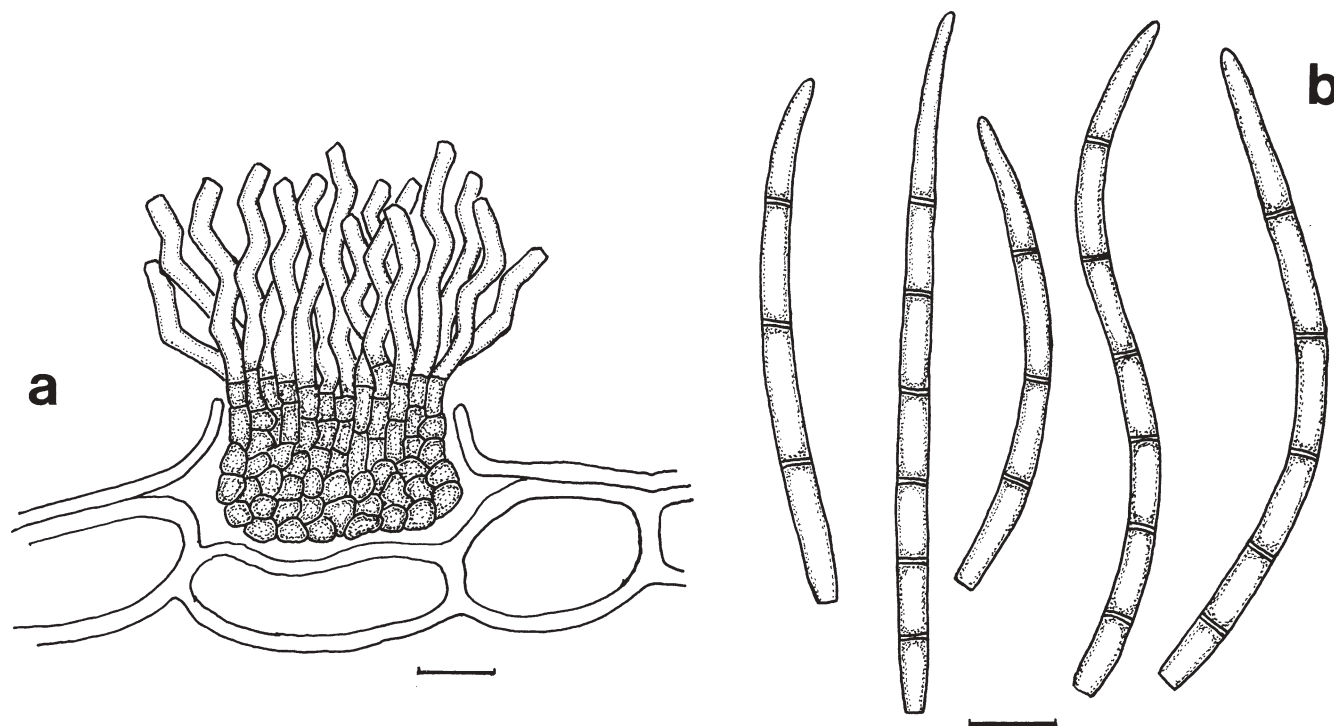


Fig. 2. *Pseudocercospora hachijokibushi*. a Stroma and conidiophores. b Conidia. Bar 10µm

Stachyurus, two species of *Cercospora* and its allied genera have hitherto been known. *Cercospora stachyuricola* X.J. Liu et Y.L. Guo (1984) described on *S. sinensis* Franch. clearly differs from the present species in having long and dark-colored conidiophores bearing thickened scars, and acicular, hyaline conidia. The present fungus is also distinguishable from *P. stachyurina* Goh et W.H. Hsieh (1989; Hsieh and Goh 1990) described on *S. himalaicus* Hook. f. et Thomson ex Benth., by its amphigenous fruit bodies, formation of distinct stromata, and cylindric to obclavate conidia. In case of *P. stachyurina*, fruit bodies are hypophyllous without stroma, and conidia are acicular to aciculate obclavate. Moreover, the size of conidiophores and conidia of the present fungus are somewhat larger than those of *P. stachyurina*. From these points, the fungus collected at Ohshima Island on *Stachyurus praecox* var. *matsuzakii* is described as a new species, *Pseudocercospora hachijokibushi*.

3. *Pseudocercospora fukuokaensis* (Chupp) X.J. Liu et Y.L. Guo

Figs. 3, 7, 13, 14
Guo and Liu, *Mycosystema* 5:103, 1992; Guo and Hsieh, The genus *Pseudocercospora* in China: 324, 1995; Shin and Braun, *Mycotaxon* 58:164, 1996; Kobayashi et al., *Mycoscience* 39:191, 1998; Liu and Guo. *Flora Fungorum Sinicorum* 9:338, 1998.

≡ *Cercospora fukuokaensis* Chupp in Togashi et Katsuki, *Sci. Rept. Yokohama Nat. Hist. Univ. Ser. II* 1:2, 1952; Chupp, A monograph of the fungus genus *Cercospora*: 559, 1954; Katsuki, *Cercosporae of Japan*: 63, 1965.

Leaf spots angular to irregular, vein-limited, often confluent, 2–5 mm in diameter, reddish-brown, later turn to grayish-white with dark brown border. Stromata mainly epiphyllous, intraepidermal, then erumpent, brown, 24–48 µm in diameter. Conidiophores densely emerging from the upper part of stromata, pale brown, simple, with distinct and thin conidial scars, 19–44 × 2.4 µm. Conidia oblong cylindrical to oblong obclavate, straight to curved, with a thin hilum, pale olive to pale greenish-brown, smooth, 1–9-septate, 38–94 × 1.9–4.3 µm, 68.3 × 3.3 µm on average.

Host: *Styrax japonica* var. Siebold et Zucc. *jippeikawamurae* (Yanagita) H. Hara (in Japanese: Ooba-Egonoki); Senzu, Ohshima-machi, Ohshima Island, Tokyo, Sept. 29, 2001 by HH (TFM: FPH-7620).

Disease name: Brown leaf spot (Kappan-byo in Japanese).

Note: The present species was first described as *Cercospora fukuokaensis* Chupp in Togashi and Katsuki (1952), and was recently transferred to the genus *Pseudocercospora* based on the reexamination of its morphological characteristics (Guo and Liu 1992). It has been well known as the pathogen of the leaf spot on *Styrax japonica* (Japanese name: Egonoki) and *S. obassia* Siebold et Zucc. (Haku'unboku) throughout Japan (Kobayashi et al. 1998; Nakashima 2001). *S. japonica* var. *jippeikawamurae* is newly added to the host plants of the present species.

4. *Pseudocercospora myrticola* (Speg.) Deighton

Figs. 4, 8, 15, 16

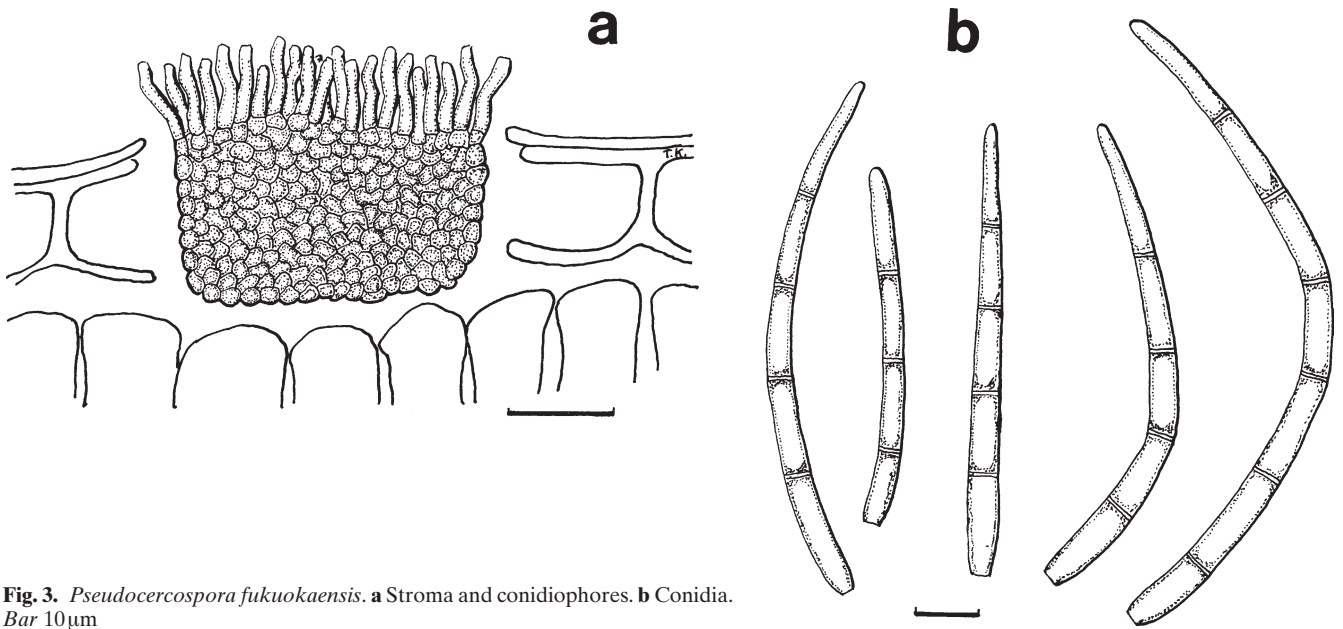


Fig. 3. *Pseudocercospora fukuokaensis*. **a** Stroma and conidiophores. **b** Conidia. Bar 10µm

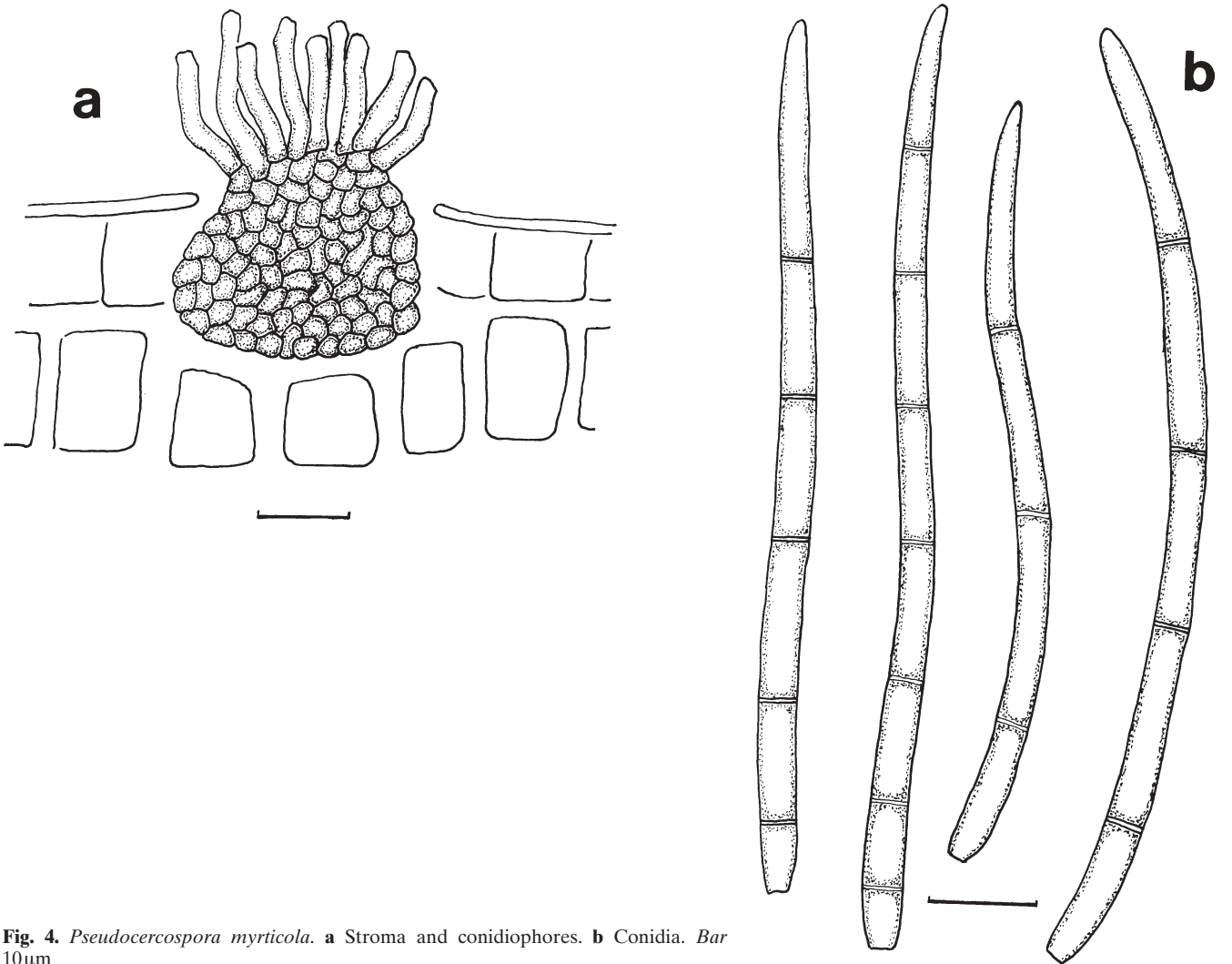
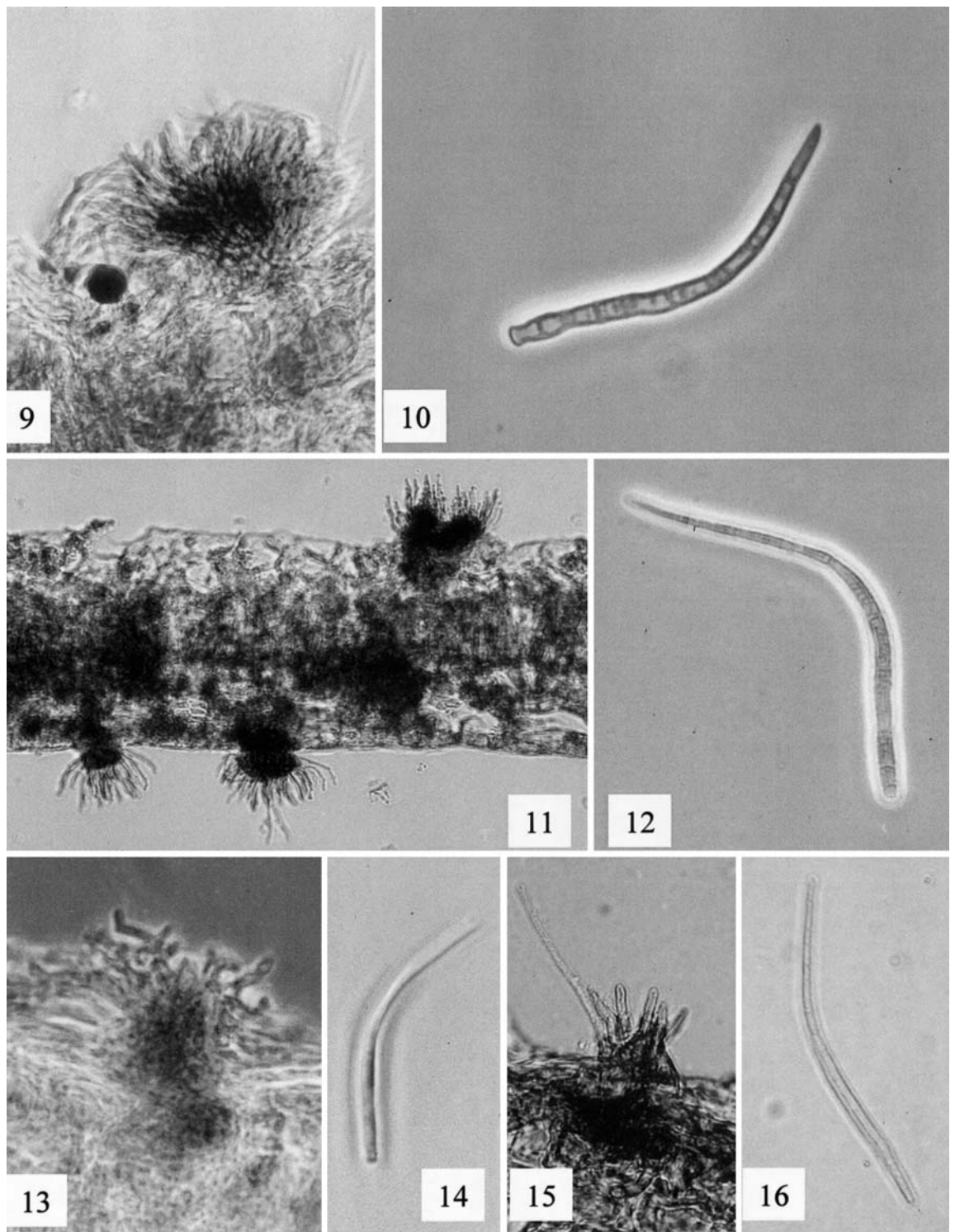


Fig. 4. *Pseudocercospora myrticola*. **a** Stroma and conidiophores. **b** Conidia. Bar 10µm



Figs. 5-8. 5 Disease symptom of *Helwingia japonica* caused by *Pseudocercospora izuohshimensis*. 6 Disease symptom of *Stachyurus praecox* var. *matsuzakii* caused by *P. hachijokibushi*. 7 Disease symptom of *Myrtus communis* caused by *P. myrticola*. 8 Disease symptom of *Styrax japonica* var. *jippeikawamurae* caused by *P. fukuokaensis*.



Figs. 9–16. Stroma (9) and conidia (10) of *Pseudocercospora izuohshimensis*. Stromata (11) and conidia (12) of *P. hachijokibushi*. Stromata (13) and conidia (14) of *P. fukuokaensis*. Stromata (15) and conidia (16) of *P. myrticola*

Mycol Pap 140:148, 1976; Crous and Braun, Mycotaxon 57:284, 1996; Crous, Mycol Res 103:613, 1999.

≡ *Cercospora myrticola* Speg., An. Soc. Cient. Argent. 16:167, 1883 (Saccardo, Sylloge Fungorum 10:643, 1892); Chupp, A monograph of the fungus genus *Cercospora*: 407,

1954; Katsuki and Kobayashi, Trans Mycol Soc Jpn 16:10, 1975.

Leaf spots amphigenous, irregular to angular, 2–4 mm in diameter, rusty-brown, abundant on the lower leaf surface, usually confluent. Stromata amphigenous, mainly

hypophyllous, intraepidermal, then erumpent, brown, pseudoparenchymatous, globular, 16–27 µm in diameter. External hypha absent. Conidiophores arising from the upper part of stromata, simple, straight to slightly geniculate, pale brown to pale olive, aseptate, densely fasciculate, 16–39 × 2.4–3.6 µm. Conidia cylindrical, straight or curved, with truncate basal end, with obconical head, pale olive to pale olivaceous-brown, 1–8-septate, 50–106 × 2.4–4.3 µm, 84.7 × 3 µm on average.

Specimen examined: *Myrtus communis* L. (Japanese name: Ginbaika, Ginkobai); Senzu, Ohshima-machi, Ohshima Island, Tokyo, Sept. 29, 2001, by HH (TFM: FPH-7619).

Disease name: Leaf spot (Hanten-byo in Japanese).

Note: *Cercospora myrticola* Speg. was added to the Japanese mycoflora by Katsuki and Kobayashi (1975). Afterward, it was transferred to the genus *Pseudocercospora* based on its morphological characteristics by Deighton (Deighton 1976). However, taxonomic reevaluation of the Japanese material of *C. myrticola* has not been done, because no specimen has been preserved. This time, fresh diseased material was collected from Ohshima Island. Examination of the causal fungus on this material confirmed that it was *Pseudocercospora myrticola*.

References

Chupp C (1954) A monograph of the fungus genus *Cercospora*. Published by the author, Ithaca

- Crous PW (1999) Species of *Mycosphaerella* and related anamorphs occurring on Myrtaceae (excluding *Eucalyptus*). *Mycol Res* 103:607–621
- Crous PW, Braun U (1996) Cercosporoid fungi from South Africa. *Mycotaxon* 57:233–321
- Deighton FC (1976) Studies on *Cercospora* and allied genera. VI. *Pseudocercospora* Speg., *Pantospora* Cif. and *Cercoseptoria* Petr. *Mycol Pap* 140:1–168
- Guo YL, Hsieh WH (1995) The genus *Pseudocercospora* in China. International Academic Publishers, Beijing
- Guo YL, Liu XJ (1992) Studies on the genus *Pseudocercospora* in China. VI. *Mycosystema* 5:99–108
- Horie H, Kobayashi T (1984) Diseases of ornamental woody plants observed at Higashiyama Botanical Park, Nagoya. *Trans Annu Meet Jpn For Soc* 95:443–444
- Hsieh WH, Goh TK (1990) *Cercospora* and similar fungi from Taiwan. Maw Chang, Taipei
- Katsuki S (1965) Cercosporae of Japan. *Trans Mycol Soc Jpn extra issue* 1
- Katsuki S, Kobayashi T (1975) Cercosporae of Japan and allied genera (supplement 3). *Trans Mycol Soc Jpn* 16:1–15
- Kobayashi T, Nishijima T, Nakashima C (1998) Addition and reexamination of Japanese species belonging to the genus *Cercospora* and allied genera. I. Collections from Nansei-Islands (1). *Mycoscience* 39:185–194
- Liu XJ, Guo YL (1984) Five new species of the genus *Cercospora*. *Acta Mycol Sin* 3:102–108
- Nakashima C (2001) Taxonomic study of *Cercospora* and allied genera in Japan. Doctoral dissertation, TUA (Tokyo University of Agriculture), Tokyo
- Saccardo PA (1892) *Sylloge Fungorum* 10. Patavii
- Shin HD, Braun U (1996) Notes on Korean Cercosporae and allied genera (II). *Mycotaxon* 58:157–166
- Togashi K, Katsuki S (1952) New or noteworthy parasitic fungi in Japan. II. *Sci Rep Yokohama Nat Univ Sect II* 1:1–7