

# Addition and reexamination of Japanese species belonging to the genus *Cercospora* and allied genera I. Collections from Nansei-Islands (1)

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In the first report of the present series, six species collected from Nansei Islands were discussed. Of these, one found on *Elaeocarpus japonica* was described as a new species, *Pseudocercospora elaeocarpicola*. *Pseudocercospora plumeriae* on *Plumeria rubra* was transferred from the genus *Cercospora* and added to the Japanese fungous flora, together with *Cercosporidium bougainvilleae* on *Bougainvillea spectabilis*. One of the three remaining species, *Pseudocercospora punicae* on *Punica granatum* was newly recorded from Nansei Islands. On the other two species, namely *P. circumscissata* and *P. fukuokaensis*, some additional notes concerning distribution and host range were described.

Key Words—*Cercospora* and allied genera; Japanese species; Nansei Islands; reexamination.

The genus *Cercospora* was established by Fresenius in 1853. The number of species is increasing year by year, because most species are plant pathogenic and seem to be monoxenic. In Chupp's world monograph (Chupp, 1953), about 1,800 species were accepted in the genus *Cercospora*. According to Pollack (1987), the number of specific epithets once placed in the genus *Cercospora* exceeds 3,000. In recent years, the genus was divided into several genera by Deighton (1967, 1971, 1973, 1974, 1976, 1979, 1983, 1987) based on such criteria as the bearing and separating forms of conidia from the conidiophores, the presence or not of stroma, external hypha, and the thickening of the separating point of conidia and conidiophores. Deighton's concept on the genus *Cercospora* and its segregates has commonly been accepted in a recent systematic classification of hyphomycetes and among applied plant pathologists.

In Japan, Yamamoto and Maeda (1960) listed 229 Japanese species of *Cercospora* with the descriptions cited from Chupp's monograph. Five yr later, Katsuki (1965) published a monograph of the genus *Cercospora* in Japan. In this monograph, most of the 226 Japanese species were described on the basis of his own observations.

Recently, Hsieh and Goh (1990) reexamined Formosan *Cercospora* and its allies. In Mainland China, Guo (1986a, b), Guo and Hsieh (1995), Guo and Liu (1989, 1992), Liu and Guo (1982, 1988) also reexamined Chinese species of *Cercospora* and its allied genera. Based on Deighton's concept many species were segregated from the genus *Cercospora* and transferred to the allied genera. These included many *Cercospora*

species recorded from Japan. However, many Japanese species of *Cercospora* have not yet been reexamined.

According to Pollack (1987), 95 species of *Cercospora* have been listed as new species by Japanese investigators. Of these, 40 have already been removed to other genera and 9 have been kept in the genus *Cercospora* sensu stricto. The purpose of the present series of papers is to reexamine Japanese species of *Cercospora* and its allies, to reassign them to the proper genera and to add some species new to Japan.

## Enumeration and Descriptions of the Species

1. *Cercosporidium bougainvilleae* (Muntanola) Sobers et Seymour, Proc. Fl. State Hort. Soc. **81**: 397. 1969.

Figs. 1, 4a–c

Basionym: *Cercospora bougainvilleae* Muntanola, Rev. Argent. Agron. **24**: 84. 1957.

Synonym: *Cercospora bougainvilleae* Rao, Ind. Phytopathol. **15**: 112. 1962.

Leaf spots circular, grayish white to grayish brown, with brown border, 1–5 mm in diam, many on one leaf, and produce many black sooty masses on both surfaces of the spot. Stromata are distinct, amphigenous, brown to dark brown, 15–65  $\mu\text{m}$  in diam, without external hyphae. Conidiophores arise from the upper cells of stroma, loosely fasciculate, pale brown to brown, 0–3-septated, simple, flexuous, 30–70  $\times$  4.5–5.5  $\mu\text{m}$ , with clear and thick conidial scars. Conidia are holoblastic, sympodial, pale olive brown to olive brown, obclavate, straight or slightly curved, 3–5-septate, 22–63  $\times$  6–7.5  $\mu\text{m}$ , with thick scar or hilum at the end, finely verrucous.

Host: *Bougainvillea spectabilis* Eilld. (Bugenbirea or Ikada-kazura).

Disease name: Circular leaf spot (Maruhoshi-byo) (Kobayashi et al., 1992).

Specimen examined: *Bougainvillea spectabilis* – Campus of Ryukyu Univ., Nishihara-cho, Nakagami-gun, Okinawa Pref. (Okinawa Is.), 11 Nov. 1994, by Takao Kobayashi (TK) (TFM: FPH-7481); Tonan Bot. Garden, Okinawa-shi, Okinawa Pref. (Okinawa Is.), 12 Nov. 1994, by TK (TFM: FPH-7482); Campus of Trop. Plant Inst., Ryukyu Univ., Funaura, Taketomi-cho, Yaeyama-

gun, Okinawa Pref. (Iriomote Is.), 4 March 1997, by TK and Chiharu Nakashima (CN) (TFM: FPH-7480); Ban'na Park, Ishigaki-shi, Okinawa Pref. (Ishigaki Is.), 5 March 1977, by TK and CN.

Note: This is the first record of the circular leaf spot disease of *B. spectabilis* caused by *C. bougainvilleae* from Japan. The disease and its pathogen were easily identified as *C. bougainvilleae*, based on a good accordance of symptoms and morphological characteristics with those in the records (Table 1). *Stenella bougainvilleae* Yen et Lim is apparently different from the present

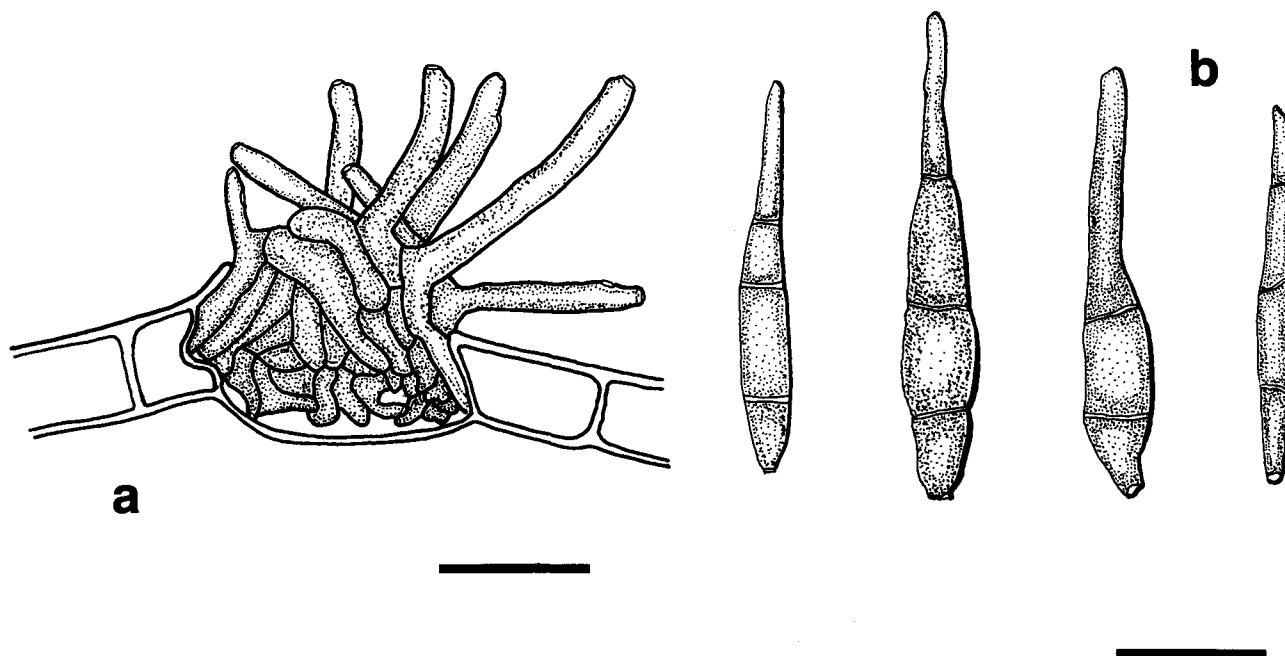


Fig. 1. *Cercosporidium bougainvilleae*.

a: Stroma and conidiophores, b: Conidia. Scale bars: 20  $\mu$ m.

Table 1. Morphological characteristics of *Cercosporidium* and related genera on *Bougainvillea*.

Fungus	Leaf spot (mm)	Stroma ( $\mu$ m)	Conidiophore ( $\mu$ m) (scar)	Conidium	
				Size ( $\mu$ m) (scar)	Septum
<i>Cercosporidium</i> from Nansei Islands	circular	amphigenous	30–70 $\times$ 4.5–5.5	23–63 $\times$ 6–7.5 (+)	3–5 <sup>a)</sup>
	1–5	15–65	(thick)	pale olive brown	
<i>Cercosporidium</i> <i>bougainvilleae</i>	circular	amphigenous	59–148 $\times$ 3.5–7	24–90 $\times$ 4.2–8 (+)	3–5 <sup>b)</sup>
	–5	–70	(thick)	pale olive brown	
<i>Cercospora</i> <i>bougainvilleae</i>	circular	amphigenous	–130 $\times$ 4–6	28–80 $\times$ 4–8 (+)	3–5 <sup>c)</sup>
			(thick)	mid pale brown	
<i>Cercospora</i> <i>bougainvilleae</i>	circular	amphigenous	35–85 $\times$ 4.5–5	35–80 $\times$ 5–7.5 (+)	2–4 <sup>d)</sup>
	1–5	18–50	(thick)	pale olive brown	
<i>Stenella</i> <i>bougainvilleae</i>	circular	none, fruiting	54–169 $\times$ 3.6–5.4	6–64 $\times$ 3.2	2–6 <sup>e)</sup>
	2–3	30–52		hyaline	
<i>Stenella</i> <i>bougainvilleae</i>	circular	none, fruiting	30–90 $\times$ 3–4	20–65 $\times$ 2.5–4	3–6 <sup>f)</sup>
	1–7	hypophyllous		pale olive brown	

a) The authors, on *B. spectabilis*. b) Sobers and Martinez (1966), on *B. glabra* and *B. stipitata*. c) Ellis (1976), on *Bougainvillea*. d) Kobayashi and Oniki (1994), on *B. spectabilis*. e) Rao (1962), on *B. spectabilis*. f) Yen and Lim (1982), on *B. spectabilis*.

fungus in its hypophyllous fruiting without stroma and narrower conidia.

*Cercosporidium bougainvilleae* has been recorded from South America (Argentina, Venezuela), Central America (Cuba, El Salvador, Jamaica), North America (USA), Asia (India, Indonesia) and Oceania (Hawaii) on *Bougainvillea glabra* Choisy ex DC, *B. spectabilis* and *B. stipitata* Gris. (Alfieri et al., 1984; Ancalmo, 1961; Bilgrami et al., 1991; Ellis, 1976; Farr et al., 1989; Kobayashi and Oniki, 1994; Kobayashi et al., 1992; Pollack, 1987; Raabe et al., 1981; Rao, 1962; Sahni, 1966; Sobers and Martinez, 1966; Sobers and Seymour, 1969).

Pathogenicity of the causal fungus to *Bougainvillea* was confirmed by Kobayashi and Oniki (1994) in Indonesia. The disease may have spread from Central America to other areas through transfer of the diseased host plant.

**2. *Pseudocercospora elaeocarpicola* Kobayashi, Nishijima et Nakashima, sp. nov.** Figs. 2, 4d-f

Maculis in foliis vivis, orbiculatis vel paulo irregularibus, 5–10 mm diam, centro pallide brunneis vel griseo-brunneis, ad marginem atro-brunneis; stromatibus claris, generaliter epiphyllis, perraro amphigenis, atro-brunneis, 15–78  $\mu\text{m}$  diam, sine hyphis exterior; conidiophoris pallide brunneis vel pallide olivaceis, rectis vel flexuosis, cicatricibus distinctis praeditis, 13–58  $\times$  3–4  $\mu\text{m}$ ; conidiis pallide olivaceis, obclavatis, erectis vel curvatis, 3–8-septatis, 30–78  $\times$  2.5–4  $\mu\text{m}$ , laevibus, ad basim truncatis et leptodermis, ad apicem attenuatis.

Holotypus: on leaves of *Elaeocarpus japonicus* Sieb. et Zucc. (Koban-mochi) – Mt. Minamimeiji, Nago-shi, Okinawa Pref. (Okinawa Is.), 10 Nov. 1994, by TK (TMF: FPH-7477).

Leaf spots are circular to somewhat irregular, 5–10 mm in diam, pale brown to grayish brown, with brown border, and diseased leaves gradually become yellowish. Stromata are distinct, generally epiphyllous, rarely amphigenous, dark brown, 15–78  $\mu\text{m}$  in diam, without external hyphae. Conidiophores are loosely fascicled, straight or flexuous, pale brown to pale olive brown, 13–58  $\times$  3–4  $\mu\text{m}$ , cicatrix distinct but thin-walled. Conidia are obclavate, pale olive brown, 3–8-septate, straight or curved, 30–78  $\times$  2.5–4  $\mu\text{m}$ , smooth, truncate at the basal end without thickening, somewhat tapering at the top.

Host and specimen examined: See holotypus.

Disease name: Sooty leaf spot (Susukabi-byo) (new

name).

Note: On *Elaeocarpus*, the only known species of *Cercospora* and its allied genera is *Pseudocercospora elaeocarpi* Sutton et Sankaran (Sutton and Sankaran, 1995). However, it is clearly distinguished from the present fungus by its hypophyllous stroma without any

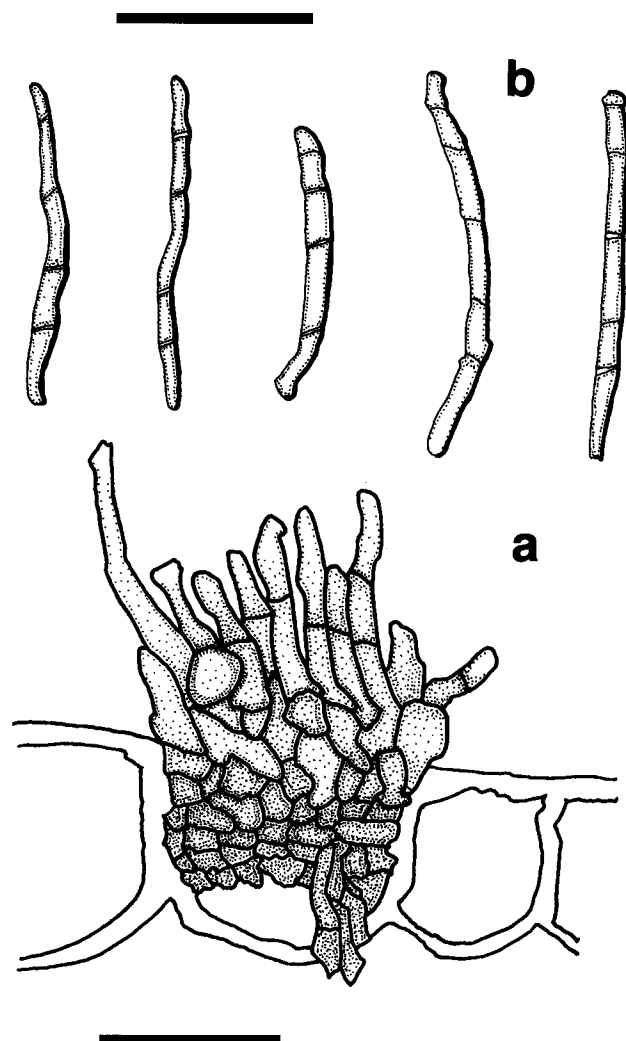


Fig. 2. *Pseudocercospora elaeocarpicola*. a: Stroma and conidiophores. b: Conidia. Scale bars: 30  $\mu\text{m}$ .

Table 2. Morphological characteristics of *Pseudocercospora* on *Elaeocarpus*.

Fungus	Leaf spot	Stroma ( $\mu\text{m}$ )	External hyphae	Conidiophore ( $\mu\text{m}$ )	Conidium	
					Size ( $\mu\text{m}$ )	Septum
<i>Pseudocercospora</i> from Nansei Islands	circular, brown, 5–10	mainly epiphyllous, 15–78	–	13–58 $\times$ 3–4	30–78 $\times$ 2.5–4	3–8 <sup>a)</sup>
<i>Pseudocercospora elaeocarpi</i>	none (without spot)	hypophyllous – 80	+ hypophyllous	14–48 $\times$ 3–4	50–85 $\times$ 3–5	5–7 <sup>b)</sup>

a) The authors, on *Elaeocarpus japonicus*. b) Sutton and Sankaran (1995), on *Elaeocarpus* sp.

leaf spot and the presence of many external hyphae producing simple conidiophores, as shown in Table 2. Therefore, the fungus found at Okinawa Is. is treated as a new species of *Pseudocercospora*, *P. elaeocarpicola*.

3. *Pseudocercospora plumeriae* (Chupp) Kobayashi, Nishijima et Nakashima, comb. nov. Figs. 3, 4g-i  
Basionym: *Cercospora plumeriae* Chupp, Monograph of *Cercospora*, p. 49. 1953.

Leaf spots are brown, angular to irregular, 2–15 mm in size, clearly separate from healthy area; on the lower leaf surface, borders of spots are indistinct. Stromata are epiphyllous as minute black dots at first, then covered with greenish gray powdery masses consisting of conidiophores and conidia, olive brown, 50–100  $\mu\text{m}$  in

diam; on the lower leaf surfaces, many external hyphae emerge from stomata and produce conidiophores and conidia singly without stroma, giving the surface of the spot a fine, greenish, powdery appearance. Conidiophores on stroma are simple, short, straight or flexuous, 12–20  $\times$  2–3  $\mu\text{m}$ , conidial release scars clear but thin-walled. Conidia are cylindrical to oblong-obclavate, pale olive brown, 3–5-septate, 32–80  $\times$  2–2.5  $\mu\text{m}$ , tapering at apex, truncate at the end without thickening, smooth.

Host: *Plumeria rubra* L. (Akahana-indo-sokei).

Disease name: Brown leaf spot (Kappan-byo) (Kobayashi, 1980).

Specimen examined: *Plumeria rubra* – Otomi, Taketomi-cho, Yaeyama-gun, Okinawa Pref. (Iriomote Is.), 7 Dec. 1988, by TK and Masatoshi Onuki (MO);

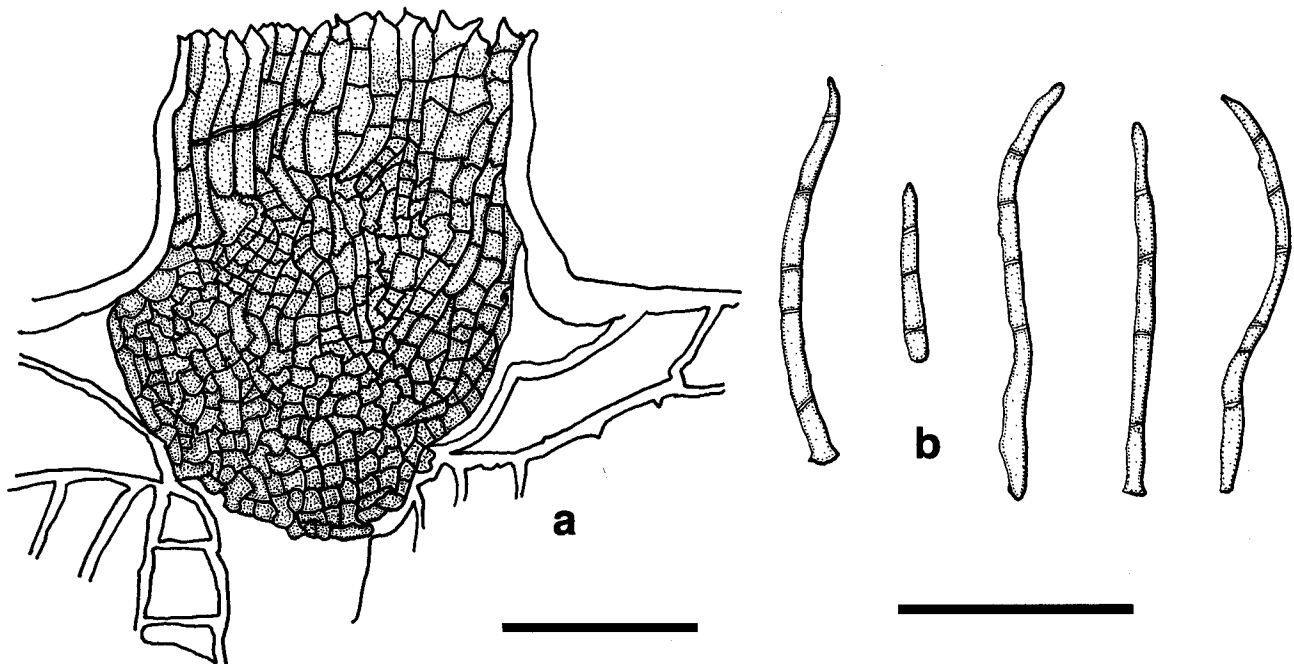


Fig. 3. *Pseudocercospora plumeriae*.

a: Stroma and conidiophores, b: Conidia. Scale bars: a = 50  $\mu\text{m}$ ; b = 30  $\mu\text{m}$ .

Table 3. Morphological characteristics of *Cercospora* and related genera on *Plumeria*.

Fungus	Leaf spot (mm)	Stroma ( $\mu\text{m}$ )	External hyphae <sup>a)</sup>	Conidiophore ( $\mu\text{m}$ ) (scar)	Conidium	
					Size ( $\mu\text{m}$ ) (scar)	Septum
<i>Pseudocercospora</i> sp. from Nansei Is.	irregular 2–15	epiphyllous 50–100	hypophyllous	12–20 $\times$ 2–3 (thin)	32–60 $\times$ 2–2.5 (thin)	3–5 <sup>b)</sup>
<i>Cercospora</i> <i>plumeriae</i>	irregular 2–15	epiphyllous 15–40	hypophyllous	30–80 $\times$ 3–5	20–65 $\times$ 2–4	1–5 <sup>c)</sup>
	irregular 2–15	epiphyllous 20–40	hypophyllous	10–50 $\times$ 2.5–3 (thin)	30–63 $\times$ 2–3 (thin)	2–5 <sup>d)</sup>
<i>Cercospora</i> <i>plumerifolii</i>	subcircular 3–45	amphigenous 70–95	—	28–41 $\times$ 3.5–4	23–70 $\times$ 3–3.5	1–7 <sup>e)</sup>

a) Conidiophore and conidium are singly produced from external hyphae (=running hyphae) on leaf surface. b) The authors, on *Plumeria rubra*. c) Chupp (1953), on *P. acuminata*. d) Kobayashi (1980), on *P. rubra* and *P. alba*. e) Batista et al. (1960), on *P. obovata*.



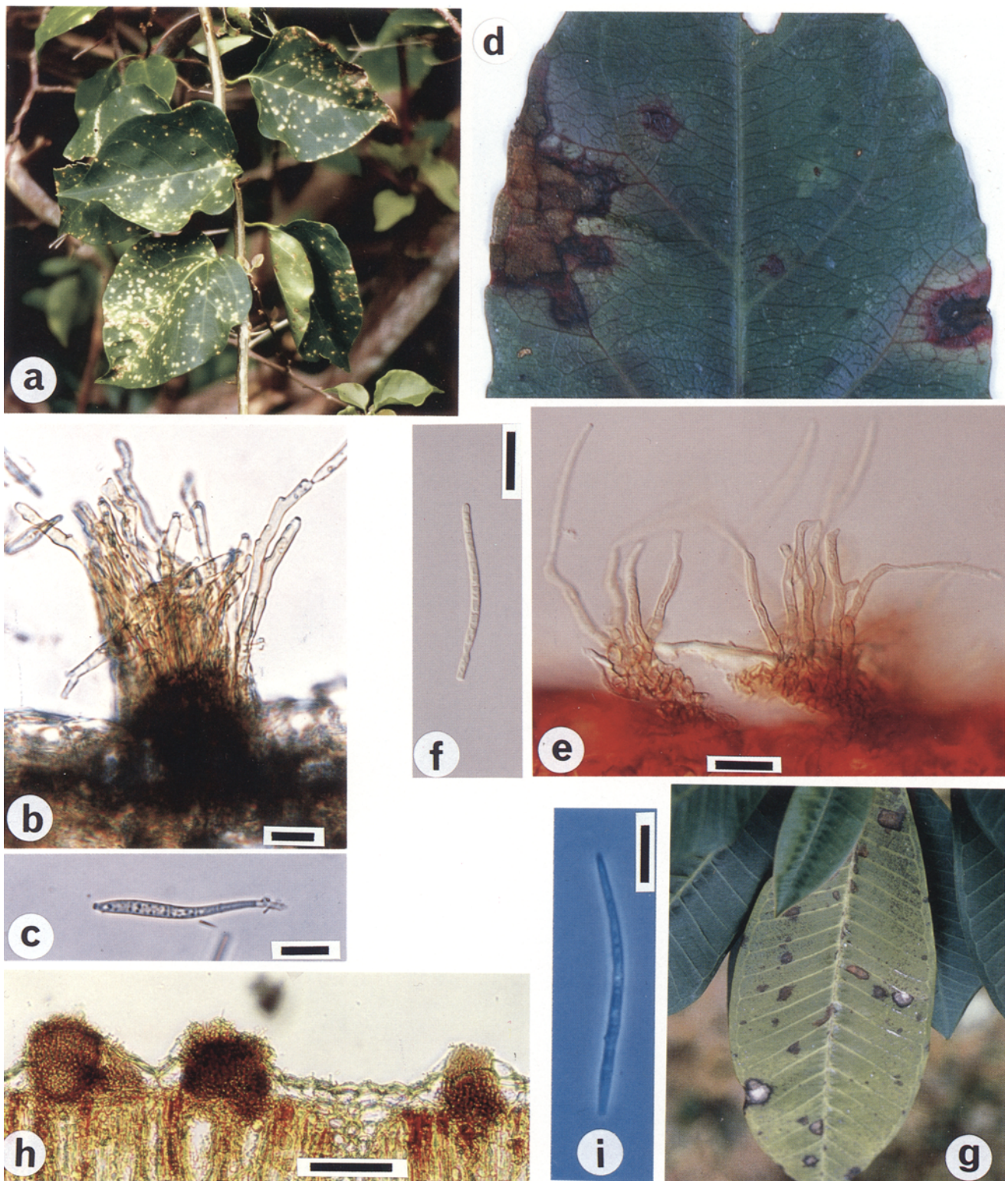


Fig. 4. *Cercosporidium bougainvilleae* (a–c); *Pseudocercospora elaeocarpicola* (d–f); *Pseudocercospora plumeriae* (g–i).  
a, d, g: Symptoms; b, e, h: Stromata and conidiophores; c, f, i: Conidia. Scale bars: b, c, i = 10  $\mu\text{m}$ ; e, f = 20  $\mu\text{m}$ ; h = 50  $\mu\text{m}$ .

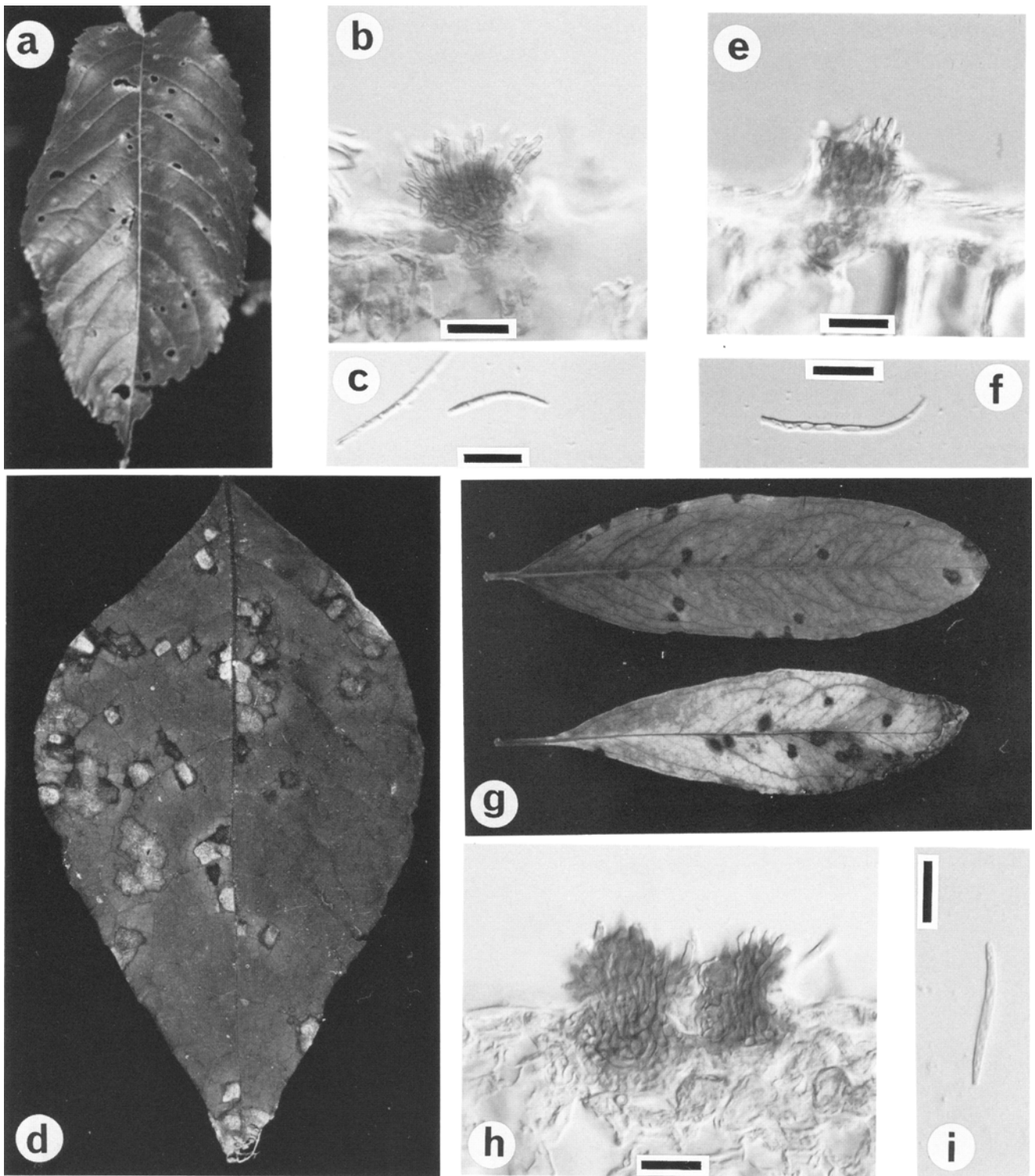


Fig. 5. *Pseudocercospora circumscissa* (a–c); *Pseudocercospora fukuokaensis* (d–f); *Pseudocercospora punicae* (g–i). a, d, g: Symptoms; b, e, h: Stromata and conidiophores; c, f, i: Conidia. Scale bars: 20  $\mu$ m.



Tonan Bot. Park, Okinawa-shi, Okinawa Pref. (Okinawa Is.), 12 Feb. 1990, by TK and Choei Ogimi (CO) (TFM: FPH-7478).

Note: Although a few leaf spots are produced on each leaf, diseased leaves soon become yellow and defoliate before maturing. On *Plumeria*, two species of *Cercospora* have hitherto been described. Symptoms and morphological characteristics of the present fungus collected from Nansei Islands were identical with those of *C. plumeriae* Chupp (Chupp, 1953), as shown in Table 3, except that the conidial scar is not described in the literature. The other species, *Cercospora plumerifolii* Batista et Peres (Batista et al., 1960), is distinguishable from *C. plumeriae* by its circular spot, amphigenous stroma and thicker conidia (Table 3). As noted above, the cicatrix on conidiophores and the basal scars of conidia in the present fungus are clear but thin without thickening. Therefore, brown leaf spot fungus of *Plumeria* was transferred to the genus *Pseudocercospora* as *P. plumeriae*. This is the first record of the fungus from Japan.

The present fungus has been recorded from Bangladesh, India, Indonesia, Malaysia, the Philippines, and USA on *Plumeria acutifolia* Poir., *P. alba* L., *P. rubra* L., and *P. tomentosa* Poir. (Alfieri et al., 1984; Bilgrami et al., 1991; Chaudhuri, 1958; Chupp, 1953; Farr et al., 1989; Kobayashi, 1980; Kobayashi and de Guzman, 1988; Pollack, 1987; Quimio and Abilay, 1977; Rangaswami et al., 1970; Rubin, 1965; Sohi and Gupta, 1966; Tangonan and Quebral, 1994).

**4. *Pseudocercospora circumscissa*** (Sacc.) Liu et Guo, *Mycosystema* 2: 231. 1989. Figs. 5a-c

Basionym: *Cercospora circumscissa* Sacc., *Nuov. Giorn. Bot. Ital.* 8: 189. 1876.

Synonyms: *Cercospora cerasella* Sacc., *Michelia* 1: 266. 1879.

*Cercospora. cerasella* var. *arium* Roumeg., *Rev. Mycol.* 18: 71. 1896.

*Cercospora padi* Bubak et Serebriankov, *Hedwigia* 52: 271. 1912.

*Cercospora. padi* var. *mahaleb* Unam., *Bol. Soc. Espan. Hist. Nat. Madrid* 35: 435. 1935.

*Pssalora circumscissa* (Sacc.) Braun, *Mycotaxon* 55: 230. 1995.

Teleomorph: *Mycosphaerella cerasella* Aderhold, *Ber. Deutsch. Bot. Gesel.* 18: 246. 1900.

Host: *Prunus armeniaca* L. (Anzu), *P. campanulata* Maxim. (Kan-hizakura), *P. cerasus* L. (Sakuranbo), *P. incisa* Thunb. (Mame-zakura), *P. jamasakura* Sieb. ex Koidz. (Yamazakura), *P. lannesiana* (Carr.) Wilson (Satozakura), *P. lannesiana* var. *speciosa* (Koidz.) Makino (Ooshima-zakura), *P. maximowiczii* Rupr. (Miyama-zakura), *P. mume* Sieb. et Zucc. (Ume), *P. pendula* Max. (Ito-zakura), *P. persica* (L.) Batsch (Momo), *P. persica* var. *densa* (Kara-momo), *P. salicina* Lind. (Sumomo) and *P. yedoensis* Matsum. (Somei-yoshino).

Disease name: Shot hole (Senko-byo) (Nishida, 1911) or (Senko-kappan-byo) (Miyake, 1923).

Specimen examined: on *Prunus campanulata*-Miyako Is., Okinawa Pref., 6 Dec. 1989, by TK and Yuji Kawabe

(YK) (TFM:FPH-7159); Ishigaki Is., Okinawa Pref., Nov. 1988, by TK and MO; Nago-shi, Okinawa Pref. (Okinawa Is.), 9 Feb. 1990, by TK; Ohgimi-son, Okinawa Pref. (Okinawa Is.), 9 Feb. by TK; Itoman-shi, Okinawa Pref. (Okinawa Is.), 12 Nov. 1994, by TK and CN; Amami-ohshima Is., Kagoshima Pref., 9 Sept. 1996, by TK and CN; Amagicho, Ohshima-gun, Kagoshima Pref. (Tokunoshima Is.), 9 Nov. 1993, by TK. On *Prunus persica*-Iriomote Is., Okinawa Pref., 9 Dec. 1988, by TK and MO; Ishigaki Is., Okinawa Pref., Nov. 1988, by TK and MO.

Note: The present species was recently transferred to the genus *Pseudocercospora* from *Cercospora* sensu lato based on the reexamination of Chinese materials (Guo and Liu, 1989). In Japan the present fungus has been recorded from Hokkaido to Kyushu Districts except Nansei Islands (Katsuki, 1965; Ono, 1964). In recent years, it was also recorded from Miyako, Ishigaki and Iriomote Is. of Nansei Islands (Kobayashi and Kawabe, 1992; Kobayashi et al., 1990), and certain materials were additionally collected from Okinawa Is, Amami-ohshima Is. and Tokuno-shima Is. as listed above. Teleomorph of the fungus was observed on cherry (*Prunus*) leaves by Miyake (1923).

Besides Japan, this species has hitherto been recorded on various species of *Prunus* trees throughout the temperate to subtropical zones, namely on *P. americana*, *P. angustifolia*, *P. armeniaca*, *P. avium*, *P. besseyi*, *P. campanulata*, *P. caroliniana*, *P. cerasus*, *P. davidiana*, *P. divaricata*, *P. domestica*, *P. emarginata*, *P. dulcis*, *P. laeocerasus*, *P. mahaleb*, *P. mume*, *P. mume* var. *formosana*, *P. munsoniana*, *P. padus*, *P. pennsylvanica*, *P. persica*, *P. pumila*, *P. salicina*, *P. serotina*, *P. spinosa*, *P. taiwaniana*, *P. tenella*, *P. virginiana*, *P. virginiana* var. *melanocarpa*, *P. yedoensis* and *Prunus* sp. from North America (Canada, USA), Central America (Cuba), South America (Argentina, Brazil, Paraguay, Uruguay), Asia (China, Cyprus, India, Iran, Israel, Korea, Palestine, Taiwan), Australasia (Australia), Europe (France, Germany, Italy, Romania, Turkey, UK, USSR, Yugoslavia) and Africa (Libya, Morocco, Zimbabwe) (Anonymous, 1986; 1992; Bilgrami et al., 1991; Chupp, 1953; De Brotos et al., 1981; El-Buni and Rattan, 1981; Ershad, 1977; Farr et al., 1989; Guo and Hsieh, 1995; Hsieh and Goh, 1990; Kobayashi, 1984; Kreisel, 1971; Little, 1987; Marchionatto, 1928; Nakata and Takimoto, 1928; Palti et al., 1977; Simmonds, 1966; Tsai, 1991; Viégas, 1945; Warcup and Talbot, 1981).

**5. *Pseudocercospora fukuokaensis*** (Chupp) Liu et Guo in Guo et Liu, *Mycosystema* 5: 103. 1992. Figs. 5d-f

Basionym: *Cercospora fukuokaensis* Chupp apud Togashi et Katsuki, *Sci. Rept. Yokohama Nat. Univ. Ser. II*, 1: 2. 1952.

Host: *Styrax japonica* Sieb. et Zucc. (Egonoki).

Disease name: Brown leaf spot (Kappan-byo) (Yamamoto and Maeda, 1960).

Specimen examined: Iriomote Is., Okinawa Pref., Dec. 1988, by TK and MO; Tokunoshima-cho, Ohshima-gun, Kagoshima Pref. (Tokunoshima Is.), 8 Nov. 1993,

by TK and Tsuyoshi Hosoya (TH); Mt. Inokawa, Ohshima-gun, Kagoshima Pref. (Tokunoshima Is.), 9 Nov. 1993, by TK and TH.

Note: The present fungus was first described by Chupp (Togashi and Katsuki, 1952) based on a Japanese material collected at Fukuoka Pref., Kyushu District. Recently, it was recombined as *P. fukuokaensis* by Guo and Liu (Liu and Guo, 1992), who studied several Chinese materials. In Japan, the fungus has been recorded from Kanto to Kyushu districts including the Nansei Islands (Amami-ohshima and Iriomote Is.) (Horie and Kobayashi, 1983; Katsuki, 1965; Kobayashi et al., 1990; Ogawa, 1984; Suto, 1987). Thereafter, diseased materials on *S. japonica* were additionally collected from Tokunoshima Is. as listed above.

The present species has hitherto been recorded only from China and Japan on *Styrax dasyantha* Perk., *S. japonica*, *S. tonkinensis* Pierce and *Styrax* sp. (Guo and Hsieh, 1995; Katsuki, 1965).

**6. *Pseudocercospora punicae* (Henn.) Deighton, Mycol. Pap. 140: 151. 1976. Figs. 5g-i**

Basionym: *Cercospora punicae* Henn., Engl.'s Bot. Jahrb. 37: 165. 1906.

Teleomorph: *Mycosphaerella lythracearum* Wolf, J. Agr. Res. 35: 465. 1927.

Host: *Prunus granatum* L. (Zakuro).

Disease name: Leaf spot (Hanten-byo) (Hara, 1916).

Specimen examined: Kabira, Ishigaki-shi, Okinawa Pref. (Ishigaki Is.), Nov. 1988, by TK and MO; Taketomicho, Yaeyama-gun, Okinawa Pref. (Hateruma Is.), 15 March 1994, by TK; Hirara, Miyako Is. Okinawa Pref., 6 Dec. 1989, by TK and YK (TFM: FPH-7168); Setouchicho, Ohshima-gun, Kagoshima Pref. (Amami-ohshima Is.), 11 Nov. 1993, by TK and TH.

Note: The teleomorph of the fungus has not been recorded from Japan. The anamorph has been recorded from Kanto to Kyushu districts including Amami-ohshima Is. (Hara, 1917; Katsuki, 1965; Suto, 1975; Yasu, 1936). In recent years, it was additionally collected from Amami-ohshima Is., Ishigaki Is., Miyako Is. and Hateruma Is. of the Nansei Islands (Kobayashi, 1996; Kobayashi and Kawabe, 1992; Kobayashi et al., 1990).

Besides Japan, *P. punicae* has been recorded on *Punica granatum* from Asia (Cambodia, China, Hong Kong, India, Nepal, Pakistan, Taiwan, Thailand), North America (USA), Central America (Bermuda, Cuba, Puerto Rico, San Domingo), South America (Brazil, Venezuela), Africa (Ethiopia, Kenya, Mauritius, South Africa, Tanzania, Zambia), and Oceania (Hawaii) (Bilgrami et al., 1991; Chupp, 1953; Dennis, 1970; Giatgong, 1980; Dodge, 1950; Guo and Hsieh, 1995; Litzemberger et al., 1962; Raabe et al., 1981; Stevenson, 1975; Tsai, 1991).

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