

FULL PAPER

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## Four new species of *Phyllosticta*, one new species of *Pseudocercospora*, and one new combination in *Passalora* from Japan

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**Abstract** During a survey of plant-inhabiting fungi in a botanical garden in Japan, some noteworthy fungi were collected from leaf spots of some herbal and arboreal plants. Among them, five new species are described, namely: *Phyllosticta ardisiicola* on *Ardisia crenata*, *Phy. aspidiicola* on *Aspidistra elatior*, *Phy. kerriae* on *Kerria japonica*, *Phy. fallopiae* on *Fallopia japonica*, and *Pseudocercospora davidiicola* on *Davidia involucreta*. *Passalora pyrrosiae*, a new combination for *Pseudocercospora pyrrosiae* on *Pyrrosia lingua*, is proposed based on its morphological characteristics designating the neotype specimen.

**Key words** Cercosporoid fungi · Neotypification · *Phyllosticta* sensu stricto · Plant parasitic fungi

### Introduction

In recent years, inventory of plant-inhabiting fungi has become a matter of great concern. Such an inventory significantly contributes to the field of plant pathology and to a grasp of fungal flora. Hence, we carried out an inventory on plant-inhabiting fungi in Higashiyama Botanical Garden in Nagoya, Aichi Prefecture, Japan. Horie and Kobayashi (1984) made a survey on diseases of ornamental woody plants in this garden and reported 48 diseases on 57 woody plants. However, they did not work on the fungi associated with herbal plants. In the course of this survey, we collected 29 fungal genera from the specimens of herbal and arboreal plants belonging to 106 genera of 55 families in 2005 and 2006 (data not shown). Of them, some noteworthy fungi including new species were collected. In this article, four new species of the genus *Phyllosticta* (*Phy. ardisiicola*, *Phy. aspidiicola*, *Phy. kerriae*, and *Phy. fallopiae*) and one new species of the genus *Pseudocercospora* (*Ps. davidiicola*) are

reported. Furthermore, *Ps. pyrrosiae* is transferred to the genus *Passalora* based on its morphological characteristics with notes about the designation of its neotype specimen.

### Materials and methods

The specimens were collected in Higashiyama Botanical Garden, Chikusa, Nagoya, Aichi Prefecture, located in central Japan. Specimens for microscopic examination were prepared by hand sections from the freshly collected materials or herbarium specimens deposited in the mycological herbarium of the National Science Museum (TNS), Tsukuba, Ibaraki Prefecture, Japan. Specimens were mounted in Shear's medium. To obtain living cultures, monoconidial isolates were established according to the protocols of Nakashima and Kobayashi (1997). Dried specimens are maintained in the Herbarium of Forest Mycology and Pathology, Forestry and Forest Products Research Institute (TFM:FPH), Tsukuba, Ibaraki Prefecture, Japan, or Mycological Herbarium, Laboratory of Plant Pathology, Mie University (MUMH), Tsu, Mie Prefecture, Japan. Cultures are maintained in the National Institute of Technology and Evaluation (NBRC), Kisaradzu, Chiba Prefecture, Japan, or Genebank, National Institute of Agrobiological Sciences (MAFF), Tsukuba, Ibaraki Prefecture, Japan. For the comparative study of growth of mycelial colonies, an isolate originating from a single conidium on leaf spot was used. Mycelial colonies grown on OMA (Difco oatmeal agar; Becton Dickinson, Hunt Valley, MD, USA) plates at 25°C for 1 month were transferred to OMA plates and incubated at 28°C under dark conditions. After 14 days, diameters of the colonies were recorded.

### Results and discussion

#### New species of the genus *Phyllosticta*

In recent years, the concept of the genus *Phyllosticta* was reconstructed by van der Aa and collaborators (van der Aa

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1973; van der Aa and Vanev 2002). In this concept, *Phyllosticta* sensu stricto (s. str.) was newly proposed, as follows: ...“foliicolous or ramulicolous, stromatic conidiomata, conidiogenesis holoblastic, conidia one-celled (only exceptionally two-celled), hyaline, often  $10\text{--}20 \times 5\text{--}10 \mu\text{m}$ , globosal, roundish or ellipsoidal, usually filled with greenish guttules, surrounded by a slime layer and provided with an apical extracellular (non-cellular) appendage, conidial base usually truncate.” Similarly, they proposed the species concept in which the species epithet was given with distinguishable morphology on diseased leaf of host plant and cultural characteristics (van der Aa 1973; van der Aa and Vanev 2002). On the other hand, Okane et al. (2001, 2003) isolated endophytic *Phyllosticta* from intact leaves of 66 plant species and one variety in 54 genera of 38 families. All cultures were identified as a single species, *Phyllosticta capitalesis* Henn., based on morphology and sequence analysis of ribosomal DNA internal transcribed spacer regions. However, the phylogenetic relationship of *Phyllosticta* species inhabiting leaf spot is not yet revealed. Hence, we applied van der Aa’s species concept (van der Aa 1973; van der Aa and Vanev 2002) in this study. The chronology and particulars of the species concept were discussed in another paper (Motohashi et al. 2008).

***Phyllosticta ardisiicola*** Motohashi, I. Araki & C. Nakash., sp. nov. Figs. 1a–c, 7a,b

Maculae in acie folii vivi semicircularis, saepe concentricae, pallide brunneae vel brunneae, 5–12 mm diametro, marginem atro-brunneae. Pycnidia amphigena, subglobosa vel globosa,  $71\text{--}96 \times 74\text{--}108 \mu\text{m}$ . Paries pycnidii ex cellulis depressis vel irregularibus 2–3-stratosis compositus, brunneus vel fuscus, circa ostiolum fuscus. Cellulae conidioge-

nae holoblasticae, hyalinae, cylindrica vel conicae,  $5\text{--}12.5 \times 1.2\text{--}2.5 \mu\text{m}$ , cum vel sine proliferationibus percurrentibus. Conidia continua, globosa, elliptica vel obovata, primo basi truncata, posterius utrinque rotundata,  $7\text{--}11 \times 5\text{--}7.5 \mu\text{m}$ , strato mucoso circumdantia, guttulas numerosas continetia, apice appendice  $2.5\text{--}5 \mu\text{m}$  longa praedita.

Type specimen: On *Ardisia crenata* Sims, Higashiyama Botanical Garden, Chikusa, Nagoya, Aichi Prefecture, Japan, October 24, 2005, collected by I. Araki and K. Motohashi (holotype, TFM:FPH-7838; isotype, MUMH 10221; ex-type culture, MAFF 240060 and NBRC 102261).

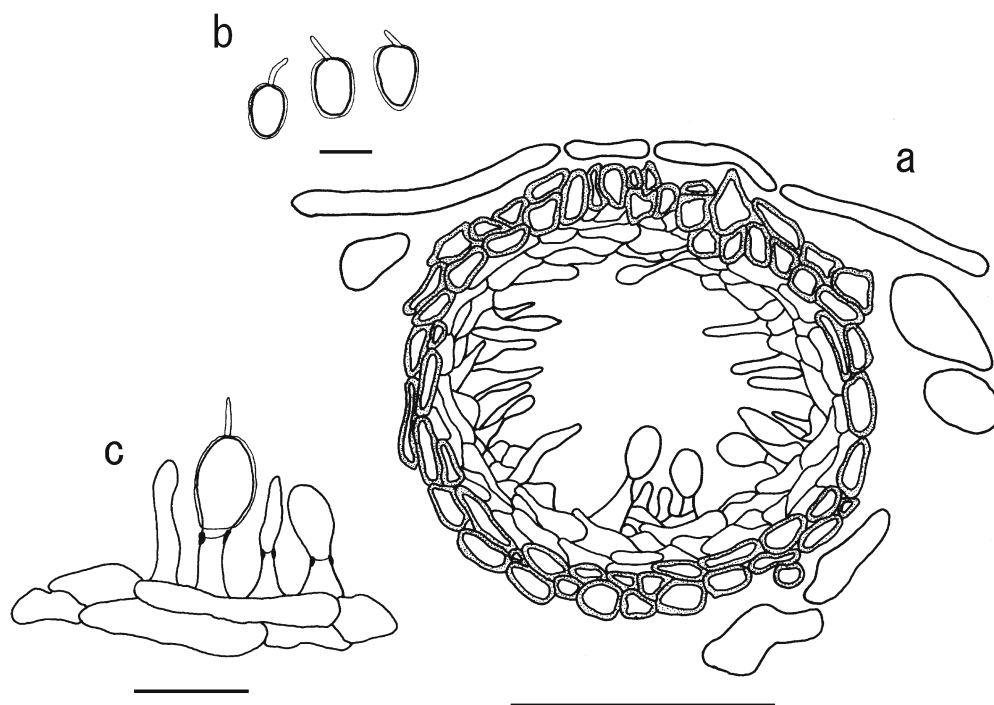
Etymology: *ardisiicola*, derived from the genus name of the host plant.

Leaf spots semicircular at edge of leaf, often extended with concentric rings, pale brown to brown, 5–12 mm in diameter, surrounded by dark brown border. Pycnidia amphiphylous, subepidermal, subglobose to globose,  $71\text{--}96 \times 74\text{--}108 \mu\text{m}$ . Pycnidial wall composed of depressed or irregular cells in 2–3 layers, brown to dark brown, darker around ostiole, hyaline or paler toward the inside. Conidiogenous cells holoblastic, hyaline, cylindrical or conical,  $5\text{--}12.5 \times 1.2\text{--}2.5 \mu\text{m}$ , proliferating at least once, with minute periclinal thickenings. Conidia unicellular, globose, ellipsoid to obovoid, truncate at the base when young, later rounded at both ends,  $7\text{--}11 \times 5\text{--}7.5 \mu\text{m}$ , surrounded by a slimy layer, containing numerous minute guttules, with a slender and short apical appendage  $2.5\text{--}5 \mu\text{m}$  long.

Host: *Ardisia crenata* Sims (Myrsinaceae; “Manryou” in Japanese).

Note: Hitherto known species of the genus *Phyllosticta* on *Ardisia* plants are *Phy. ardisiae* Trinchieri on *Ardisia humilis* and *A. sieboldii* Miq., and *Phyllosticta* anamorph of *Guignardia ardisiae* I. Hino & Katum. on *Ardisia japonica* Blume described as ‘*Phyllosticta* sp.’ by Kobayashi (1973)

**Fig. 1.** *Phyllosticta ardisiicola*.  
a Pycnidium. b Conidia.  
c Conidiogenous cells with  
developing conidia. Bars  
a 50  $\mu\text{m}$ ; b, c 10  $\mu\text{m}$



(Saccardo et al. 1931; Katsuki 1953, 1955; Kobayashi 1973; van der Aa and Vanev 2002). *Phyllosticta ardisiae* was excluded from *Phyllosticta* s. str. by van der Aa and Vanev (2002) based on its description of the morphological characteristics. However, the recent taxonomic position of *Phy. ardisiae* has not been established yet. Furthermore, Kobayashi (1973) pointed out that there were differences in the shape and size of conidia between *Phy. ardisiae* (ovoid to cylindrical,  $2\text{--}12 \times 2\text{--}5 \mu\text{m}$ ) and the *Phyllosticta* anamorph of *G. ardisiae* (drop-shaped to obovoid,  $8\text{--}11.5 \times 5.5\text{--}7.5 \mu\text{m}$ ).

On the other hand, the present new species, *Phy. ardisiicola*, belongs to the genus *Phyllosticta* s. str. because the conidia are surrounded by a slimy layer, and contain numerous minute guttules, with a slender and short tongue-like apical appendage. The shape and size of conidia and conidiophores of *Phy. ardisiicola* are identical with the *Phyllosticta* anamorph of *G. ardisiae*. However, the slimy layer and apical appendage of the conidium, which are important morphological characteristics of the species of *Phyllosticta*, were not observed on the anamorph state of *G. ardisiae*. Similarly, the mycelial colony growth rate of *Phy. ardisiicola* on OMA at  $28^\circ\text{C}$  under darkness conditions after 14 days (75.6 mm in diameter) was higher than that of *G. ardisiae* (MAFF 237100; 38.3 mm in diameter). For these reasons, *Phy. ardisiicola* collected from *A. crenata* at this time is clearly distinguishable from other species of *Phyllosticta* on *Ardisia* plants.

***Phyllosticta aspidisticola*** Motohashi, I. Araki & C. Nakash., sp. nov. Figs. 2a–c, 8a,b

Maculae folii vivi ellipticae vel irregulariter rotundatae, cinereae vel pallide brunneae, 1–7 mm diametro, marginem atro-brunneae. Pycnidia amphigena, subglobosa vel globosa,  $61\text{--}118 \times 86\text{--}110 \mu\text{m}$ . Parietis pycnidii ex cellulis depressis vel irregularibus compositus, brunneus vel fuscus, circa ostium fuscus. Cellulae conidiogenae holoblasticae, hyalinae, cylindricae, conicae vel lageniformes,  $7\text{--}12.5 \times 1.2\text{--}2.5 \mu\text{m}$ ,

cum vel sine proliferationibus percurrentibus. Conidia continua, globosa, elliptica vel obovata, primo basi truncata, posterius utrinque rotundata,  $9.5\text{--}12.5 \times 8.5\text{--}10 \mu\text{m}$ , strato mucoso circumdantia, guttulas numerosas continentia, apice appendice  $17\text{--}24.5 \mu\text{m}$  longa praedita.

Type specimen: On *Aspidistra elatior* Blume, Higashiyama Botanical Garden, Chikusa, Nagoya, Aichi Prefecture, Japan, July 19, 2005, collected by I. Araki and K. Motohashi (holotype, TFM:FPH-7870; isotype, MUMH 10441; ex-type culture, MAFF 240040 and NBRC 102244).

Etymology: *aspidisticola*, derived from the genus name of the host plant.

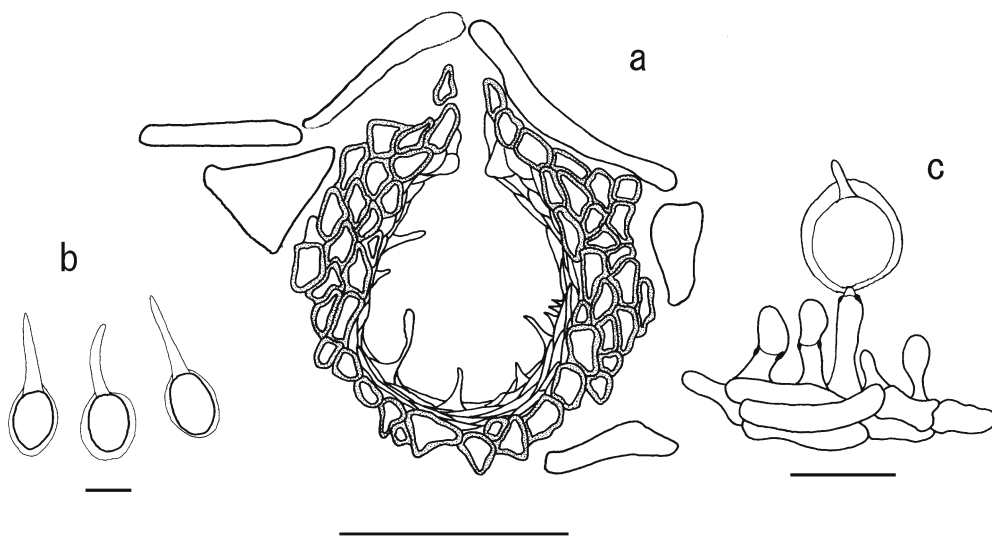
Leaf spots ellipsoid or irregularly rotundate, gray to pale brown, 1–7 mm in diameter, surrounded by dark brown border. Pycnidia amphiphylous, subepidermal, subglobose to globose,  $61\text{--}118 \times 86\text{--}110 \mu\text{m}$ . Pycnidial wall composed of depressed or irregular cells, brown to dark brown, darker around ostiole, hyaline or pale and flattened toward the inside. Conidiogenous cells holoblastic, hyaline, cylindrical, conical or lageniform,  $7\text{--}12.5 \times 1.2\text{--}2.5 \mu\text{m}$ , proliferating at least once, with minute periclinal thickenings. Conidia unicellular, globose, ellipsoid to obovoid, truncate at the base when young, later rounded at both ends,  $9.5\text{--}12.5 \times 8.5\text{--}10 \mu\text{m}$ , surrounded by a slime layer, containing numerous minute guttules, with a slender and short apical appendage,  $17\text{--}24.5 \mu\text{m}$  long.

Host: *Aspidistra elatior* Blume (Liliaceae; “Baran or Haran” in Japanese).

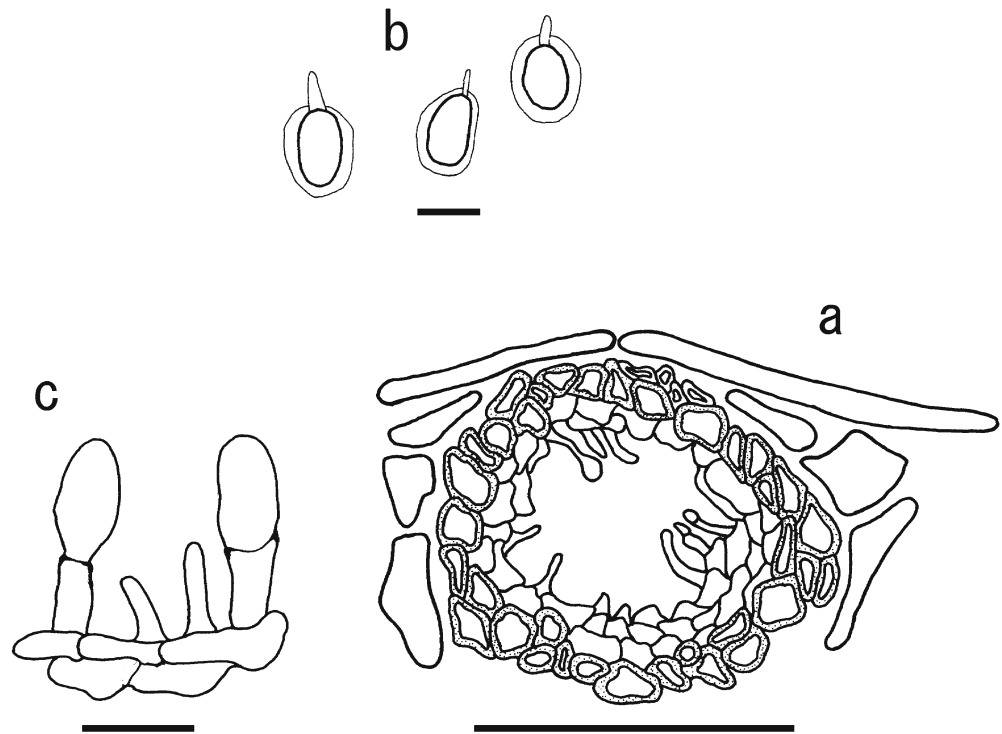
Note: On *Aspidistra* plants, *Phyllosticta aspidistrae* Oudem. on *A. elatior* Blume had been known as only a species of the fungal genus *Phyllosticta* sensu lato (s. l.) (Saccardo and Saccardo 1906; Iwata 1957). In recent years, *Phy. aspidistrae* was transferred to the genus *Asteromella* Pass. & Thüm. as *Asteromella aspidistrae* (Oudem.) Aa (van der Aa and Vanev 2002) based on the morphological characteristics of the type specimen. The genus *Asteromella* consists of the spermatial states of *Mycosphaerella* Johanson, which often occur together with young ascomata and spermatia. On the other hand, the collected and examined

**Fig. 2.** *Phyllosticta aspidisticola*.

**a** Pycnidium. **b** Conidia.  
**c** Conidiogenous cells with  
developing conidia. Bars  
**a** 50  $\mu\text{m}$ ; **b**, **c** 10  $\mu\text{m}$



**Fig. 3.** *Phyllosticta kerriae*.  
**a** Pycnidium. **b** Conidia.  
**c** Conidiogenous cells with  
 developing conidia. Bars  
 a 50  $\mu\text{m}$ ; **b**, **c** 10  $\mu\text{m}$



fungus in this survey properly belongs to the genus *Phyllosticta* s. str. Therefore, *Phy. aspidisticola* is the only species of the genus *Phyllosticta* s.str. on *Aspidistra* plants.

***Phyllosticta kerriae*** Motohashi, I. Araki & C. Nakash., sp. nov. Figs. 3a–c, 9a,b

Maculae folii vivi orbiculares vel ellipsoideae, brunneae, 3–7 mm diametro, marginem atro-brunneae. Pycnidia epiphylla, subglobosa vel globosa, 58.5–61.5  $\times$  61–71  $\mu\text{m}$ . Paries pycnidii ex cellulis depressis vel irregularibus compositus, brunneus vel fuscus, circa ostiolum fuscus. Cellulae conidiogenae holoblasticae, hyalinae, cylindrica vel conicae, 5–7.5  $\times$  1.2–2.5  $\mu\text{m}$ , sine proliferationibus percurrentibus, determinatae. Conidia continua, globosa vel elliptica, obovata, primo basi truncata, posterius utrinque rotundata, 9.5–12.5  $\times$  6–7.5  $\mu\text{m}$ , strato mucoso circumdantia, guttulas numerosas continentia, apice appendice 5–12.5  $\mu\text{m}$  longa praedita.

Type specimen: On *Kerria japonica* (L.) DC., Higashiyama Botanical Garden, Chikusa, Nagoya, Aichi Prefecture, Japan, July 19, 2005, collected by I. Araki and K. Motohashi (holotype, TFM:FPH-7832; isotype, MUMH 10445; ex-type culture, MAFF 240047 and NBRC 102251).

Etymology: *kerriae*, derived from the genus name of the host plant.

Leaf spots orbicular to ellipsoid, pale brown, 3–7 mm in diameter, surrounded by a dark brown boundary line. Pycnidia epiphyllous, subepidermal, subglobose to globose, 58.5–61.5  $\times$  61–71  $\mu\text{m}$ . Pycnidial wall composed of depressed or irregular cells, brown to dark brown, darker around ostiole, hyaline or paler and flattened toward the inside.

Conidiogenous cells holoblastic, hyaline, cylindrical or conical, 5–7.5  $\times$  1.2–2.5  $\mu\text{m}$ , determinate, without proliferations, with minute periclinal thickenings. Conidia unicellular, globose, ellipsoid to obovoid, truncate at the base when young, later rounded at both ends, 9.5–12.5  $\times$  6–7.5  $\mu\text{m}$ , surrounded by a slime layer, containing numerous minute guttules, with a slender and short apical appendage, 5–12.5  $\mu\text{m}$  long.

Host: On *Kerria japonica* (L.) DC. (Rosaceae; “Yamabuki” in Japanese).

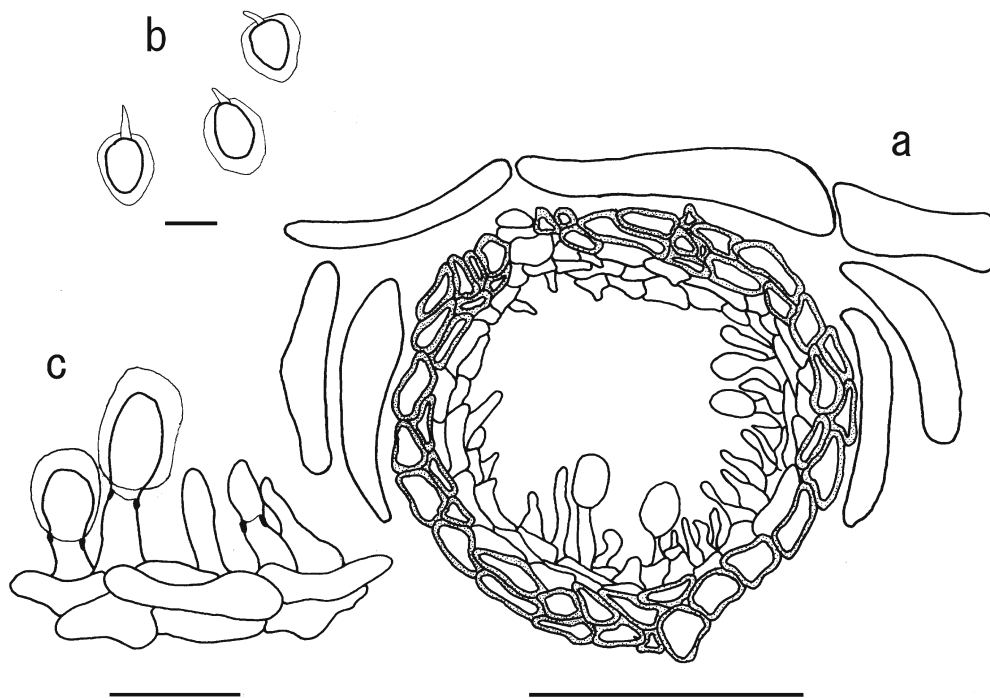
Note: Because no species of the genus *Phyllosticta* s. l. or s. str. on *Kerria* plants has been reported, *Phyllosticta kerriae* is described as a new species of *Phyllosticta* s. str. on *Kerria*.

***Phyllosticta falloppiae*** Motohashi, I. Araki & C. Nakash., sp. nov. Figs. 4a–c, 10a,b

Maculae folii vivi orbiculares, ellipsoideae vel irregulariter rotundatae, pallide brunneae vel brunneae, 3–12 mm diametro, marginem atro-brunneae. Pycnidia epiphylla, subglobosa vel globosa, 63.5–98  $\times$  61–98  $\mu\text{m}$ . Paries pycnidii ex cellulis depressis vel irregularibus compositus, brunneus vel fuscus, circa ostiolum fuscus. Cellulae conidiogenae holoblasticae, hyalinae, cylindrica vel conicae, 5–10  $\times$  1.2–2.5  $\mu\text{m}$ , cum vel sine proliferationibus percurrentibus. Conidia continua, globosa, elliptica vel obovata, primo basi truncata, posterius utrinque rotundata, 8.5–12.5  $\times$  6–7.5  $\mu\text{m}$ , strato mucoso circumdantia, guttulas numerosas continentia, apice appendice 5–12.5  $\mu\text{m}$  longa praedita.

Type specimen: On *Fallopia japonica* (Houtt.) Ronse Decr., Higashiyama Botanical Garden, Chikusa, Nagoya, Aichi Prefecture, Japan, October 24, 2005, collected

**Fig. 4.** *Phyllosticta fallopieae*.  
**a** Pycnidium. **b** Conidia.  
**c** Conidiogenous cells with  
 developing conidia. Bars  
 a 50  $\mu\text{m}$ ; b, c 10  $\mu\text{m}$



by I. Araki and K. Motohashi (holotype, TFM:FPH-7872; isotype, MUMH 10233; ex-type culture, NBRC 102266).

Etymology: *fallopieae*, derived from the genus name of the host plant.

Leaf spots orbicular to ellipsoid or irregularly rotundate, pale brown to brown, 3–12 mm in diameter, surrounded by a dark brown boundary line. Pycnidia epiphyllous, subepidermal, subglobose to globose, 63.5–98  $\times$  61–98  $\mu\text{m}$ . Pycnidial wall composed of depressed or irregular cells, brown to dark brown, darker around ostiole, hyaline or paler and flattened toward the inside. Conidiogenous cells holoblastic, hyaline, cylindrical or conical, 5–10  $\times$  1.2–2.5  $\mu\text{m}$ , proliferating at least once, with minute periclinal thickenings. Conidia unicellular, globose, ellipsoid to obovoid, truncate at the base when young, later rounded at both ends, 8.5–12.5  $\times$  6–7.5  $\mu\text{m}$ , surrounded by a slime layer, containing numerous minute guttules, with a slender and short apical appendage, 5–12.5  $\mu\text{m}$  long.

Host: *Fallopia japonica* (Houtt.) Ronse Decr. (Polygonaceae; “Itadori” in Japanese).

Note: Six species of *Phyllosticta* s. l. have been recorded from various plant genera such as *Fallopia*, *Reynoutria*, and *Polygonum* of Polygonaceae: *Phyllosticta reynoutriae* Sawada (Sawada 1958), *Phy. nieliana* Roum. (Saccardo 1892), *Phy. polygoni* Hollós (fide van der Aa and Vanev 2002), *Phy. polygoni-avicularis* Petr. (Petrak 1920), *Phy. polygoni-bungeani* Miura (Miura 1928), and *Phy. polygonorum* Sacc. (Saccardo 1878). Among them, *Phy. polygoni* was treated as a synonym of *Phoma exigua* Desm. (van der Aa and Vanev 2002). *Phyllosticta polygoni-avicularis* was transferred to the genus *Asteromella* as *A. aviculariae* (Westend.) Petr. (Petrak 1956). Furthermore, van der Aa and Vanev (2002) excluded the rest of the species from the genus *Phyllosticta* s. str. based on protologues, namely,

*Phyllosticta reynoutriae* (probably *Asteromella* state of *Mycosphaerella*), *Phy. nieliana* (spermatial state of *Mycosphaerella*), *Phy. polygoni-bungeani* (probably *Phoma* sp.), and *Phy. polygonorum* (species cannot be identified from the inadequate diagnosis). We agree with their treatment based on our reexamination of the size and shape of conidia in protologues. On the other hand, the collected fungus on *Fallopia* in this study belongs to *Phyllosticta* s. str. Therefore, *Phy. fallopieae* is described as a new species of *Phyllosticta* on *Fallopia*.

A new species of *Pseudocercospora* and a new combination in the genus *Passalora*

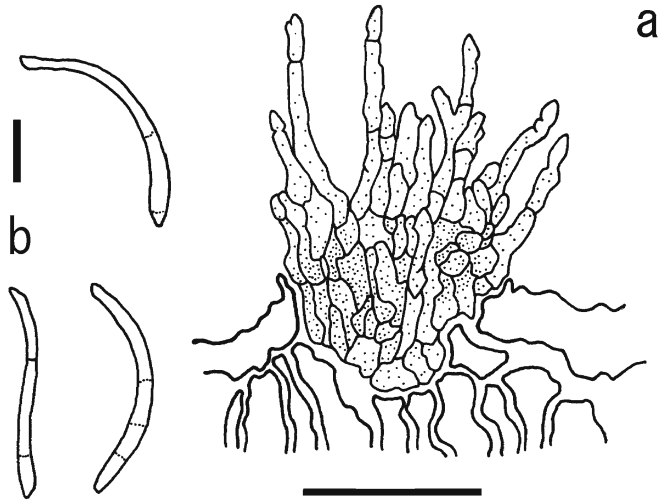
Most species of *Pseudocercospora* and *Passalora* appeared to be highly host specific with a host range confined to species of a single host genus or some allied host genera of a single family (Crous and Braun 2003). This phenomenon is continually being addressed by molecular studies (Crous et al. 2001, 2006; Den Breejën et al. 2006; Hunter et al. 2006; Taylor et al. 2003).

***Pseudocercospora davidicola*** C. Nakash., H. Horie & Tak. Kobay., sp. nov. Figs. 5a,b, 11a,b

= *Pseudocercospora jindaiensis* C. Nakash., H. Horie & Tak. Kobay. in Nakashima. Taxonomic study of *Cercospora* and allied genera in Japan: 128, 2001 (in PhD thesis, nom. inval., ICBN Art. 30).

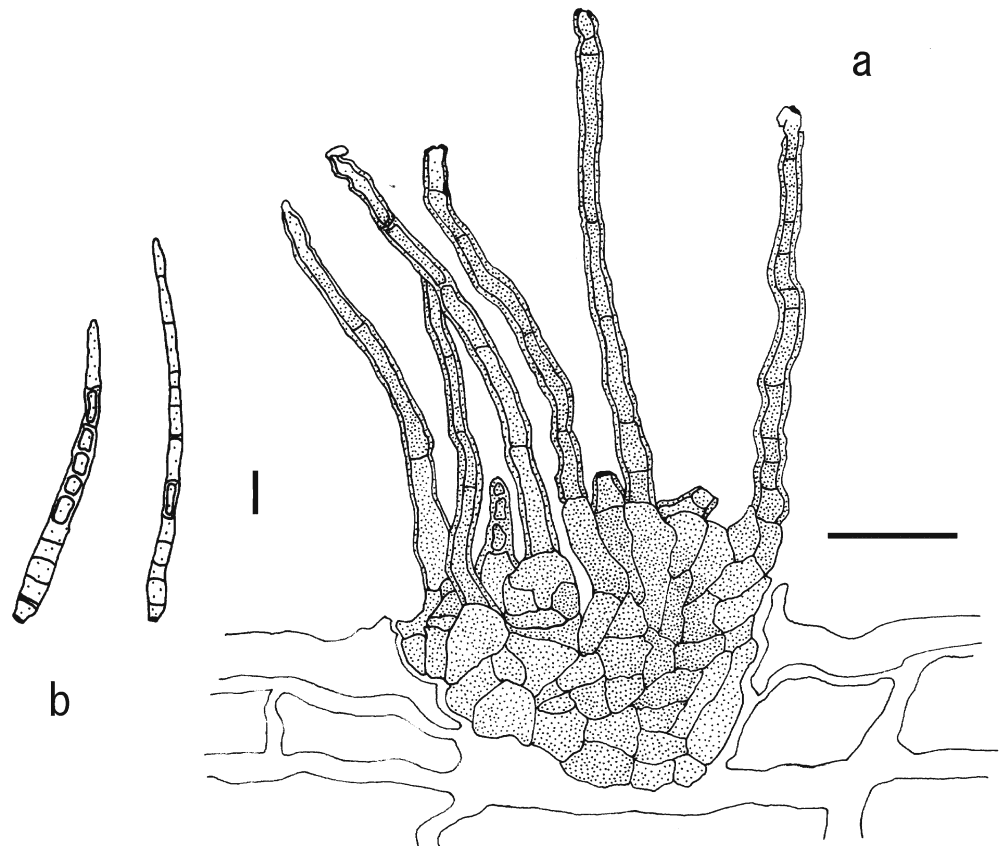
Maculae folii vivi circulares vel subcirculares, concentricae, 3–10 mm diametro, pallide brunneae vel brunneae, hyphas internas et externas praeditae. Stromata amphigena, substomatalia vel intraepidermalia, olivaceo-brunnea,

subglobosa, 12–57  $\mu\text{m}$  diametro. Conidiophora dense fasciculata, ex cellulis stromatis emergentia vel ex hyphis superficialibus oriunda, pallide olivacea, simplicia, raro ramosa, sinuosa, 12–42  $\times$  2–4  $\mu\text{m}$ , 4–10-septata. Loci conidiogeni inconspicui, non incrassati, non pigmentiferi. Conidia solitaria, cylindrica vel obclavata, recta vel leviter curvata, laevia, pallide olivacea, basi truncata, hila non incrassata, apice obtusa, 15–86  $\times$  2.5–4  $\mu\text{m}$ , 2–10-septata.



**Fig. 5.** *Pseudocercospora davidicola*. **a** Stroma and conidiophores. **b** Conidia. Bars **a** 30  $\mu\text{m}$ ; **b** 15  $\mu\text{m}$

**Fig. 6.** *Passalora pyrrosiae*.  
**a** Stroma and conidiophores.  
**b** Conidia. Bars **a** 30  $\mu\text{m}$ ;  
**b** 10  $\mu\text{m}$



Type specimen: On *Davidia involucrata* Baill., Higashiyama Botanical Garden, Chikusa, Nagoya, Aichi Prefecture, Japan, October 24, 2005, collected by I. Araki (holotype, TFM:FPH-7853; ex-type culture, MAFF 240281).

Etymology: *davidicola*, derived from the genus name of the host plant.

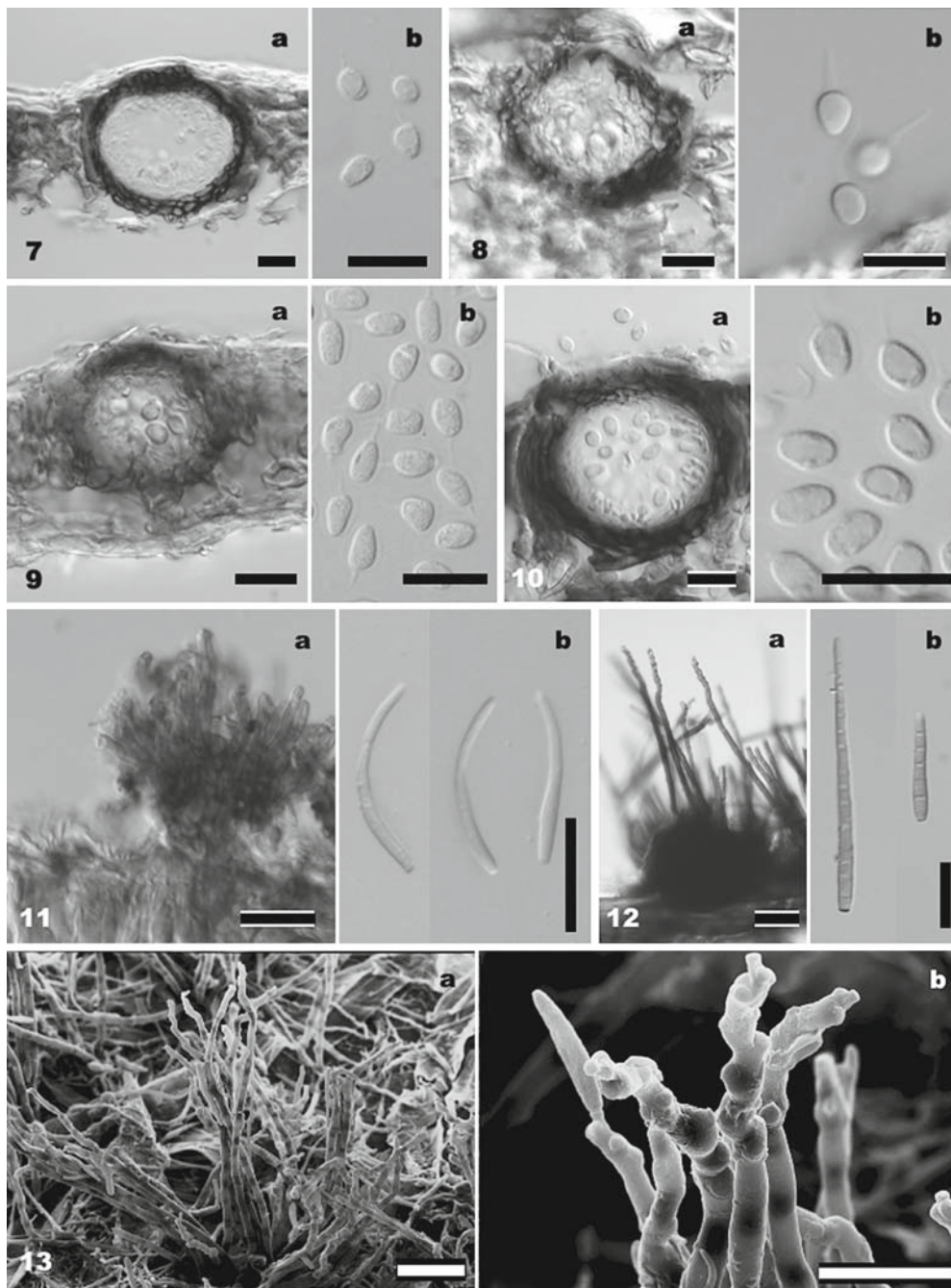
Leaf spots pale brown to brown with concentric ring, circular to subcircular, 3–10 mm in diameter. Caespituli amphigenous. Hyphae internal and external. Stromata substomatal to intraepidermal, distinct, small to well developed, olivaceous brown, subglobose, 12–57  $\mu\text{m}$  in diameter. Conidiophores arising from the upper part of stromata as well as external hyphae, pale olivaceous, densely fasciculate, simple, rarely branched, sinuous, smooth, 12–42  $\times$  2–4  $\mu\text{m}$ , 4–10-septate. Conidiogenous cell integrated, terminal, proliferating sympodially, with unthickened, inconspicuous, not darkened, not refractive conidiogenous loci. Conidia solitary, cylindrical to obclavate, straight to slightly curved, smooth, pale olivaceous, with unthickened hila, and truncate or obconically truncate basal end, tip obtuse, 15–86  $\times$  2.5–4  $\mu\text{m}$ , 2–10-septate.

Host: *Davidia involucrata* Baill. (Cornaceae; “Hankachinoki” in Japanese).

Additional specimen examined: Jindai Botanical Park, Jindaiji, Chofu, Tokyo Metropolis, Japan, October 2, 1996, collected by H. Horie; Higashiyama Botanical Garden, Chikusa, Nagoya, Aichi Prefecture, Japan, November 6, 1982, collected by H. Horie (TFM:FPH-5616).

Disease name: Brown Spot (“Kappan-byo” in Japanese; Horie and Kobayashi 1984).

**Fig. 7.** *Phyllosticta ardisiicola*.  
**a** Vertical section of pycnidium.  
**b** Conidia. Bars 20  $\mu$ m  
**Fig. 8.** *Phyllosticta aspidisticola*.  
**a** Vertical section of pycnidium.  
**b** Conidia. Bars 20  $\mu$ m  
**Fig. 9.** *Phyllosticta kerriae*.  
**a** Vertical section of pycnidium.  
**b** Conidia. Bars 20  $\mu$ m  
**Fig. 10.** *Phyllosticta fallopiae*.  
**a** Vertical section of pycnidium.  
**b** Conidia. Bars 20  $\mu$ m  
**Fig. 11.** *Pseudocercospora davidicola*. **a** Vertical section of stroma and conidiophores.  
**b** Conidia. Bars 20  $\mu$ m  
**Fig. 12.** *Passalora pyrrosiae*.  
**a** Vertical section of stroma and conidiophores. **b** Conidia. Bars **a** 40  $\mu$ m; **b** 20  $\mu$ m  
**Fig. 13.** Scanning electron microscope (SEM) picture of *Passalora pyrrosiae* on host (15 kV, osmium single fixation).  
**a** Caespituli of *P. pyrrosiae* on host plant. **b** Conidiogenous cells showing sympodial proliferation with thickened conidial scars on conidiophores. Bars **a** 40  $\mu$ m; **b** 20  $\mu$ m



Note: Horie and Kobayashi (1984) reported "*Cercospora* sp." on a *Davidia* plant collected from Higayashiyama Botanical Garden (TFM:FPH-5616). Later in 1996, a cercosporoid fungus was collected from a *Davidia* plant in Jindai Botanical Park, Tokyo Metropolis, Japan (specimen no. is not given). We confirmed that these specimens were identical with our fungus collected in Higashiyama Botanical Garden (TFM:FPH-7853, the holotype of *Ps. davidicola*). The species of the cercosporoid fungus on *Davidia* plants has not been reported yet, except *Cercospora* sp. reported by Horie and Kobayashi (1984). Therefore, the present fungus is treated as a new species.

***Passalora pyrrosiae*** (Togashi & Katsuki) C. Nakash. & I. Araki, comb. nov. Figs. 6a,b, 12a,b, 13a,b

Basionym: *Pseudocercospora pyrrosiae* Togashi & Katsuki in Katsuki, J. Jpn. Bot. 28: 287, 1953. ["*pyrrosiae*"]

Leaf spots distinct to indistinct, scattered, later confluent, reddish-brown to grayish-brown with a dark brown boundary line on upper surface, grayish-brown to brown on undersurface, 3–8 mm in diameter, sometimes covering the whole leaf surface, fuliginous. Caespituli hypophyllous. Stromata small to well developed, intraepidermal, up to 136  $\mu$ m in diameter, dark brown to olivaceous brown.

Conidiophores solitary or in moderately large fascicles of 2–18, dense, erumpent through the cuticle, pale olivaceous brown to brown, thick walled, geniculate at the apex, asperulate, proliferating percurrently or sympodially, 4–10-septate,  $74\text{--}207 \times 4\text{--}7.5 \mu\text{m}$ . Conidiogenous cell integrated, terminal, sympodial, with distinct, darkened and thickened conidiogenous loci ( $2.4\text{--}5 \mu\text{m}$  diameter). Conidia solitary, brown, cylindro-obclavate to obclavate, thick walled, straight to mildly curved, asperulate,  $27\text{--}100 \times 4\text{--}6 \mu\text{m}$ , 1–11-euseptate, rarely with a few additional distosepta, obtuse at the apex, obconically truncate to truncate and thickened at the base.

Neotype (designated here): on *Pyrrosia lingua* (Thunb.) Farw., Higashiyama Botanical Garden, Chikusa, Nagoya, Aichi Prefecture, Japan, June 6, 2005, collected by I. Araki (TFM:FPH-7852; ex-neotype culture, MAFF 240280).

Host: *Pyrrosia lingua* (Thunb.) Farw. (Polypodiaceae; “Hitotsuba” in Japanese).

Additional specimens examined: Shikanoshima, Fukuoka Prefecture, Japan, May 15, 1950, collected by S. Katsuki (TNS-F-189732); Higashiyama Botanical Garden, Chikusa, Nagoya, Aichi Prefecture, Japan, May 9, 2005, collected by I. Araki; *ibid.*, July 19, 2006, collected by I. Araki.

Note: The present species, *Ps. pyrrosiae*, was established by Katsuki (1953) as a member of the genus *Pseudocercospora* Speg. with comprehensive Latin description and illustration. However, the type specimen (on *Cyclophorus lingua* (Thunb.) Desv., Kosugidani, Yaku Island, Kagoshima Prefecture, Japan, August 7, 1951, collected by K. Togashi & S. Katsuki) and its paratypes are not preserved in TNS and TFM where their specimens are deposited. In this study, we had an opportunity to observe a specimen (*Pseudocercospora* sp.: TNS-F-189732; the genus name had been renewed from *Cercospora* to *Pseudocercospora*) collected by Katsuki with an annotation by C. Chupp. Its morphological characteristics were identical with the description of *Ps. pyrrosiae* by Katsuki (1953, 1965) and the fungus collected in this study. The specimen (TNS-F-189732) is preserved in the Togashi Collection in TNS loaned by Kobe University. However, this specimen was not cited in Katsuki (1953, 1965). According to the annotation card by Chupp (Dec. 11, 1950) in the pocket of this specimen, “*Pseudocercospora* sp. on *Cyclophorus lingua* (Thunb.) Desv. (= *Pyrrosia lingua* (Thunb.) Farw.). See (Spegazzini) Anales del Museo Nacional de Buenos Aires 20: 437, 1910. All species with thick-walled, distinctly obclavate conidia I name *Pseudocercospora* Speg. Similar ones with conidia not distinctly obclavate I name *Helminthosporium*.” Probably Togashi hesitated to identify the fungus as a species of either *Helminthosporium* or *Cercospora* and renewed its generic name from *Cercospora* to *Pseudocercospora* as on the pocket, accepting Chupp’s advice.

Examined fresh and herbarium specimens were identical with the protologue and figure of *Ps. pyrrosiae* as the result of comparative study of their morphological characteristics. Furthermore, *Ps. pyrrosiae* should be transferred to the genus *Passalora* because of its darkened and thickened conidiogenous loci and hila and colored caespituli. However, the type specimen has been lost, as already mentioned. The

obtained fresh specimen of *Ps. pyrrosiae* is selected as the neotype.

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