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Taxonomic Studies on the Genus *Marssonina* in Korea

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Eight species of *Marssonina* parasitic on 21 species of host plants from Korea are described and illustrated. They are *Marssonina brunnea* (Ellis & Everh.) Magnus, *M. capsulicola* (Rostr.) Magnus, *M. celastri* H.D. Shin & H.T. Lee, *M. coronaria* (Ellis & Davis) Davis, *M. fragariae* (Lib.) Kleb., *M. juglandis* (Lib.) Magnus, *M. rosae* (Lib.) Died. and *M. sennenis* (Gonz. Frag.) Vassiljevsky & Karak. Of these, *M. capsulicola* and *M. coronaria* sometimes poss three-celled conidia and *M. sennenis* is characterized by a short appendage at the basal end of the conidia. Morphological features of conidia and host ranges were of taxonomic values for species delimitation.

KEYWORDS: ***Marssonina*, Flora, Korea, Morphology**

The genus *Marssonina* Magnus (1906) belongs to Melanconiaceae, Coelomycetes of Deuteromycotina and is one of the important plant pathogenic fungi worldwide. The name *Marssonina* was introduced as a replacement for *Marssonia* Fisch., the latter name being a later homonym of *Marssonia* H. Karsten, a genus of the flowering plant family Gesneriaceae. The genus *Gloeosporium* was erected by Desmazieres and Montagne (1849) and its type species was *G. castagnei* Desm. & Mont. The species, however, has two-celled conidia and in this reason, was reallocated by Saccardo (1884) to the genus *Marssonia* Fisch. Until now, *Marssonina castagnei* (Desm. & Mont.) Magnus is used for this fungus. Sutton and Webster (1984) established a modern concept for this genus, but they defined *Marssonina* as having two- or three-celled conidia. However, Farr (1993) divided these fungi into two groups according to the conidial septation, *Marssonina* with two-celled conidia and *Septogloeum* with multi-celled ones. Nevertheless, it is generally accepted that *Marssonina* has two- or three-celled conidia.

The type of conidiogenesis in *Marssonina* was a subject of controversy. Thus, it was reported that conidia are produced from phialides (Arx, 1970; Sutton, 1973; Pirozynski, 1974a, 1974b, 1974c; Sivanesan and Gibson, 1976a, 1976b). However, Spiers and Hopcroft (1983) showed that the conidiogenous cells of *M. brunnea*, *M. castagnei* and *M. populi* are annellidic and holoblastic in conidiogenesis. Sutton and Webster (1984) showed that *Marssonina* had holoblastic conidiogenesis with enteroblastic conidiogenous cell proliferation. Farr (1993) proved that the conidiogenous cells in *Marssonina* proliferate percurrently to produce conidia at successively higher levels giving rise to annellides.

Though six species of *Marssonina* were listed from Korea (The Korean Society of Plant Pathology, 1998), taxonomic considerations on this genus have never been made. Furthermore, the herbarium specimens for previously recorded species of *Marssonina* have been not preserved in Korea. Therefore, we started to collect and examine *Marssonina* specimens with the aim of producing a provisional monograph of these fungi in Korea.

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Materials and Methods

A total of 74 specimens were examined in this study, of which 63 were collected during 1997~1999. In addition, 11 herbarium specimens deposited at the mycological herbarium (SMK) of the Department of Agricultural Biology, Korea University were used. Morphological characteristics of conidiomata, conidiogenous cells and conidia were examined. For the examination of the fresh materials, a small piece of infected leaves was water-mounted. Dried herbarium specimens were rehydrated in 3% KOH prior to mounting. Measurement of fungal structures was made from 30~50 replicates for each fungus at ×400 magnification (Olympus BX 50) with an eye-piece micrometer. Line drawings were made at ×1000 magnification with the aid of a drawing tube (Olympus DA) attached to the light microscope. Figures withins brackets under specimens examined represent herb. SMK accession numbers.

Key to the Korean species of *Marssonina*

1. Conidia with appendage at the base, 22.5~35 × 6.2~7.5 μm; on *Sanguisorba* ..... *M. sennenis*
1' Conidia without appendage at the base 2
2. Conidia slightly curved to curved 3
2' Conidia generally straight to slightly curved 4
3. Conidia unequally two-celled, 17.5~24 × 7.5~10 μm; on *Duchesnea*, *Fragaria*, *Potentilla* ..... *M. fragariae*
3' Conidia equally to unequally two-celled, 20~28 × 3~5 μm; on *Juglans* ..... *M. juglandis*

4. Conidia always two-celled 5
4' Conidia two- or three-celled 7
5. Conidia obovoid 6
5' Conidia ovoid, 22.3~33 × 8~14.5 μm; on *Celastrus* ..... *M. celastri*
6. Conidia not constricted at the septum, septum position at 20~30~41% from the conidium base, 12~17.5 × 5~7.5 μm; on *Populus* ..... *M. brunnea*
6' Conidia constricted at the septum, (12.5~)14~22.5(~30) × 57.5 mm; on *Rosa* ..... *M. rosae*
7. Conidia ovoid, 22.5~27 × 7.5~10 μm; on *Euonymus* ..... *M. capsulicola*
7' Conidia obovoid, 15~30 × 5~10 μm; on *Malus* ..... *M. coronaria*

Descriptions

1. *Marssonina brunnea* (Ellis & Everh.) Magnus, *Hedwigia* 45: 89 (1906) Fig. 1

≡ *Gloeosporium brunneum* Ellis & Everh., *J. Mycol.* 5: 154 (1889)

≡ *Marssonia brunnea* (Ellis & Everh.) Sacc., *Syll. Fung.* 10: 478 (1892)

Teleomorph: *Drepanopeziza tremulae* Rimpau, *Phytopathol. Z.* 43: 257 (1962)

Leaf spots amphigenous, discrete to confluent, discrete lesions 0.5~1 mm diam., angular; epigenous lesions initially brown to dark brown, later becoming grayish at center with a narrow, dark brown margin; hypogenous lesions brown to dark brown without distinct discolorations. **Mycelium** immersed, subhyaline, hyphae septate. **Conidiomata** acervular, amphigenous, discrete, circular to subcircular, erumpent through the cuticle, dehiscent by irregular rupture of the cuticular layer, brown, ca. 50~300 μm diam. **Conidiogenous cells** determinate, doliiform, simple, subhyaline to pale greenish, 5~8×2~3 μm. **Conidia** holoblastic, obovoid, straight to slightly curved, unequally two-celled, upper cell larger, lower cell smaller, apex obtuse, base subobtuse to subtruncate, usually non-constricted, but occasionally slightly constricted at the septum, subhyaline to pale greenish, guttulate with 1~3 oil drops in upper cell, and usually with one oil drop in lower cell, 12~17.5 × 5~7.5 μm, septum position at 20~30~41% from the conidium base.

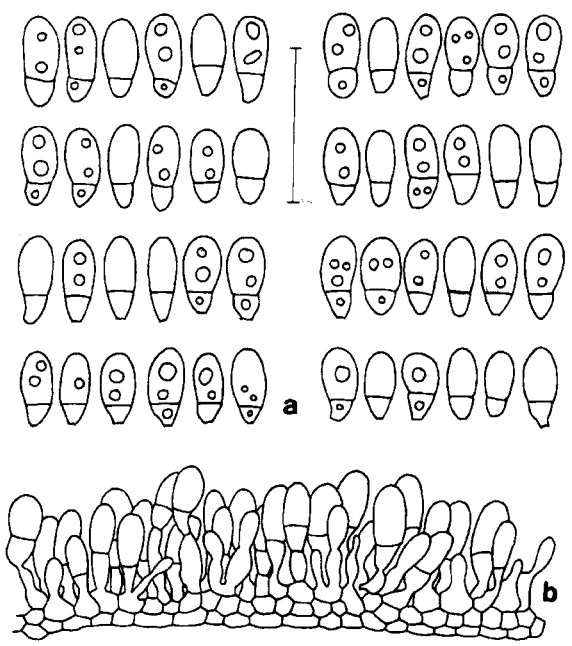

Fig. 1. *Marssonina brunnea* on *Populus euramericana*. (a) Conidia. (b) Part of the acervulus. Bar = 30 μm. (H.T. Lee del.).

Habitat: On living leaves of *Populus deltoides* Marshall, *P. euramericana* Guinier and *Populus* sp. (hybrid) (Salicaceae).

Specimens examined: On *Populus deltoides*, SMK 16560 (2 IX 1999, Namyangju); on *P. euramericana*, SMK 14937 (26 VIII 1998, Kyongju); on *Populus* sp. (hybrid), SMK 14695 (29 VI 1998, Suwon), 14701 (29 VI 1998, Suwon), 14702 (29 VI 1998, Suwon).

Distribution: Asia (China, India, Japan, Korea; and Turkey), Europe, North America, and Oceania (New Zealand).

Notes: At least, eight species of *Marssonina* are known to be associated with leaf spots of *Populus* spp. (Spiers, 1988). The species delimitation is based on the morphological characteristics of conidia. Of these, three species *M. brunnea*, *M. castagnei* and *M. populi* have similar conidia in gross morphology but differs in septum position (Spiers, 1984, 1988, 1998). The Korean collection is mostly close to *M. brunnea* in septum position (27~32~38% in Spiers, 1988).

This species was previously recorded in Korea on *P. euramericana* by Yi *et al.* (1982) who provided short description. *Populus deltoides* is a new host record to Korea.

2. *Marssonina capsulicola* (Rostr.) Magnus, *Hedwigia* 45: 91 (1906) Fig. 2

≡ *Marssonia capsulicola* Rostr., *Bot. Tidsskr.* p. 271 (1899)

Leaf spots amphigenous, discrete, 0.5~2 mm diam., circular; epigenous lesions initially brownish, later becoming whitish at center with a narrow brown margin; hypogenous lesions usually light brown to brown, older lesions with occasionally central grayish white area surrounded by a narrow brown margin. **Mycelium** immersed, hyaline, hyphae septate. **Conidiomata** acervular, amphigenous, but mostly epigenous, confluent, circular to subcircular, erumpent through the cuticle, dehiscent by irregular rupture of the cuticular layer, brown to dark brown, discrete acervuli ca. 100~350 μm diam., up to 1360 μm diam. when confluent. **Conidio-**

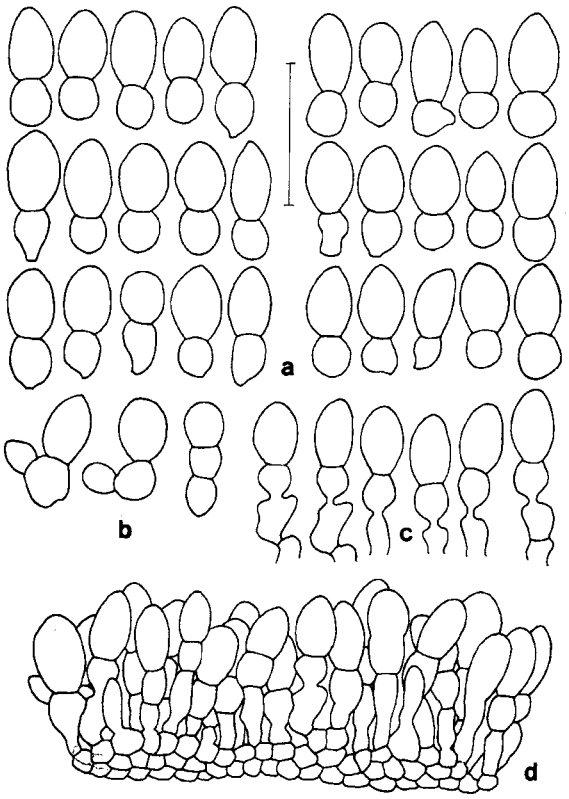

Fig. 2. *Marssonina capsulicola* on *Euonymus pauciflorus*. (a) Two celled conidia. (b) Three celled conidia. (c) Conidiogenous cells with mature or immature conidia. (d) Part of the acervulus. Bar = 30 μm. (H.T. Lee del.).

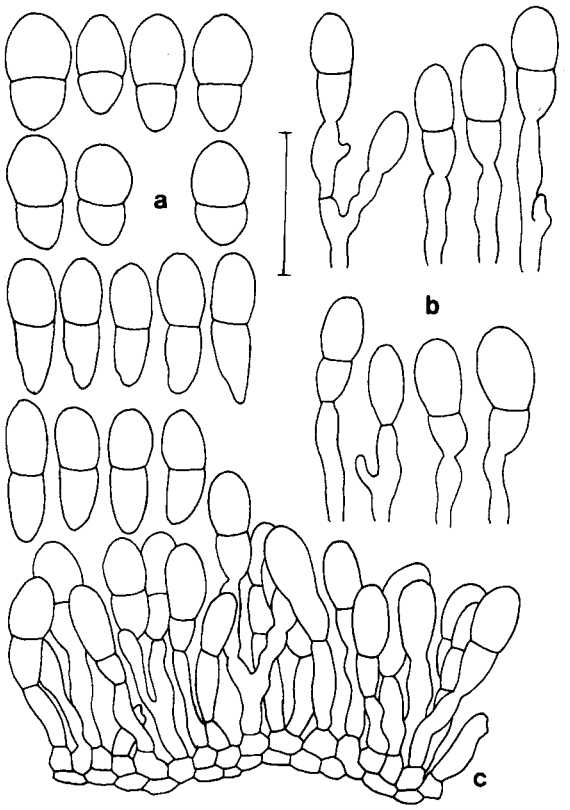

Fig. 3. *Marssonina celastri* on *Celastrus orbiculatus*. (a) Conidia. (b) Conidiogenous cells with immature conidia. (c) Part of the acervulus. Bar = 30 μm. (H.T. Lee del.).

genous cells determinate, cylindric to doliiform or irregular, hyaline, 5~15×4~5 μm. **Conidia** holoblastic, ovoid, unequally two-celled, but occasionally three-celled, three-cells straight to Y-shaped; upper cell larger, lower cell smaller, apex usually subobtuse to obtuse, but occasionally subacute, base obtuse to subtruncate, but sometimes truncate, constricted at the septum, hyaline, eguttulate, 22.5~27 × 7.5~10 μm.

Habitat: On living leaves of *Euonymus alatus* (Thunb.) Sieb. and *E. pauciflorus* Max. (Celastraceae).

Specimens examined: On *Euonymus alatus*, SMK 12822 (2 VI 1994, Kangnung), 14076 (27 VIII 1997, Kangnung), 15796 (13 V 1999, Chunchon); on *E. pauciflorus*, SMK 11652 (6 VI 1992, Pyongchang), 12403 (1 VI 1993, Pyongchang), 12771 (20 V 1994, Kangnung), 12831 (4 VI 1994, Kangnung), 13522 (13 VI 1995, Pyongchang), 13802 (25 V 1997, Namyangju), 15794 (13 V 1999, Chunchon), 15843 (23 V 1999, Yangku).

Distribution: Worldwide where the hosts are cultivated or growing.

Notes: This is the first record of this species from Korea. The Korean collections had characteristically two- or three-celled conidia. The general characteristics of the present collections are similar to the description in Saccardo (1902), but differ in having wider conidia and larger conidiomata (up to 1320 μm diam.).

3. *Marssonina celastri* H.D. Shin & H.T. Lee, *Mycotaxon* 72: 199 (1999) Fig. 3

Leaf spots amphigenous, discrete to confluent; discrete lesions 1~3 mm diam., circular to subcircular; epigenous lesions initially with a dark brown, central area surrounded by a narrow purple halo, older lesions with a central pale brown to white area surrounded by a more or less dark brown margin; hypogenous lesions similar to epigenous ones but without distinct coloration. **Mycelium** immersed, hyaline, septate. **Conidiomata** acervular, amphigenous, discrete, circular to subcircular, erumpent through the cuticle, dehiscent by irregular rupture of the cuticular layer, brown, ca. 200~800 μm diam., composed of 3~6 layers of cells, basal stroma ca. 20~40 μm deep. **Conidiogenous cells** determinate, cylindric to obpyriform or irregular, sometimes bifurcate at the base, hyaline, 16~36 × 4.2~6.8 μm. **Conidia** holoblastic, straight to slightly curved, unequally two-celled, upper cell larger, lower cell smaller, apex broadly obtuse, base obtuse to attenuated-subacute, slightly constricted at the septum, hyaline, rarely subhyaline, eguttulate, 22~33 × 8~14.5 μm.

Habitat: On living leaves of *Celastrus orbiculatus* Thunb. (Celastraceae).

Specimens examined: SMK 13360 (8 XI 1994, Kangnung), 14150 (14 IX 1997, Yangku), 14675 (22 VI 1997, Seoul), 14972 (29 VIII 1998, Seoul), 15024 (4 IX 1998, Seoul), 15093 (11 IX 1998, Seoul).

Distribution: Only known from the type locality in Korea.

Notes: *Marssonina thomasiana* (Sacc.) Sacc. was recorded on *Celastrus* species from USA (Boothroyd, 1951; Jenkins and Jehle, 1951; Greene, 1958). This fungus was transferred to *Septogloeum thomasianum* (Sacc.) Höhn. by Farr (1993) because of the enteroblastic conidiogenesis. Although conidia of the present species are similar to one septate conidia of *S. thomasianum* in size and gross morphology, the Korean collections show neither nonseptate nor two- and three-septate conidia. Therefore, this fungus was treated as a new species (Shin and Lee, 1999).

4. *Marssonina coronaria* (Ellis & Davis) Davis, *Trans. Wisc. Acad.* 17: 881 (1914) Fig. 4

= *Marssonia mali* Henn., *Engl. Bot. Jahrb.* 37: 164 (1905)

≡ *Marssonina mali* (Henn.) S. Ito, *Bot. Mag. Tokyo* 32: 206 (1918)

Teleomorph: *Diplocarpon mali* Harada & Sawamura, *Ann. Phytopath. Soc. Japan* 40: 412 (1974)

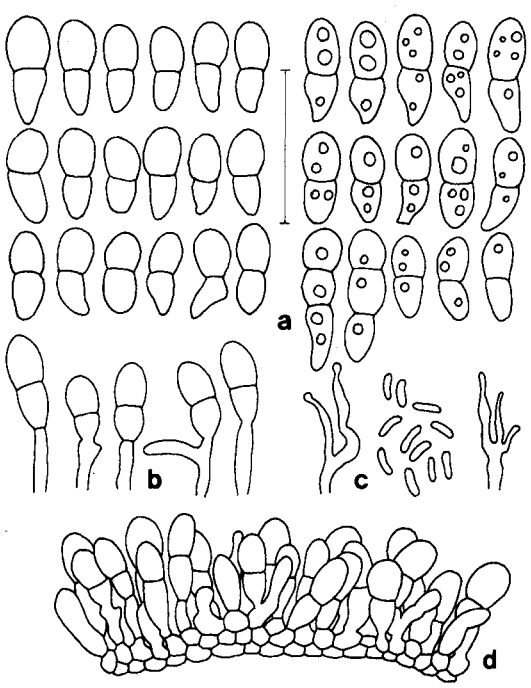

Fig. 4. *Marssonina coronaria* on *Malus pumila* var. *dulcissima*. (a) Two- and three-celled conidia. (b) Conidiogenous cells with immature conidia. (c) Microconidia and conidiogenous cells. (d) Part of the acervulus. Bar = 30 μm. (H.T. Lee del.)

Leaf spots amphigenous, discrete to confluent, angular to irregular, 2~10 mm diam.; epigenous lesions initially light brown to brown without a distinctive margin, later reddish black to purple, finally appearing as a yellow blotch with green islands; hypogenous lesions similar to epigenous ones. **Mycelium** immersed, subhyaline, hyphae septate. **Conidiomata** acervular, amphigenous, but mostly epiphyllous, discrete, circular to subcircular, erumpent through the cuticle, dehiscent by irregular rupture of the cuticular layer, brown, 50~225 μm diam. **Conidiogenous cells** determinate, cylindric, simple but occasionally bifurcate, subhyaline, 4.2~10 × 2.1~3.2 μm. **Conidia** holoblastic, obovoid, slightly curved to straight, unequally two-celled, but occasionally three-celled, apex obtuse, base subobtuse, constricted at the septum, pale greenish to subhyaline, guttulate or eguttulate, upper and lower cells each with 1~3 oil drops when guttulate, 15~24 (~30) × 5~8(~10) μm. **Microconidia** cylindric, obtuse at both ends, hyaline, eguttulate, 5~7.5 × 1.2~2.5 μm.

Habitat: On living leaves of *Malus baccata* Borkh. and *M. pumila* var. *dulcissima* Koidz. (Rosaceae).

Specimens examined: On *Malus baccata*, SMK 15446 (9 X 1998, Chunchon); on *M. pumila* var. *dulcissima*, SMK 13865 (31 V 1997, Seoul), 13988 (28 VI 1997, Suwon), 15040 (6 IX 1998, Seoul), 15080 (9 IX 1998, Namyangju), 15592 (27 X 1998, Seoul), 15611 (28 X 1998, Namyangju), 16388 (30 VII 1999, Seoul).

Distribution: Worldwide where the hosts are cultivated or wild.

Notes: Nakata and Takimoto (1928) and Park (1958) listed this fungus (under *M. mali*) on *Malus pumila* var. *dulcissima* from Korea. *M. baccata* is added here as a new host record to Korea. Ryu *et al.* (1993) provided a short note on morphology (conidia club-shaped, unequally two-celled, hyaline, 20~24 × 6.5~8.5 μm). The conidia of our collections are somewhat larger than his record: 15~23 × 5~8 μm for *Malus pumila* var. *dulcissima*, and 17.5~30 × 7.5~10 μm for *M. baccata*. These measurements, however, are within the variation of this species.

5. *Marssonina fragariae* (Lib.) Kleb., *Haupt- und Nebenfruchtformen der Askomyzeten*: 288 (1918) Fig. 5

≡ *Leptothyrium fragariae* Lib., *Cryptog. Ard. exs.* no. 163 (1832)

≡ *Gloeosporium fragariae* (Lib.) Mont., *Ann. Sci. Nat.* 12: 296 (1849)

= *Phyllosticta potentillae* Desm., *Ann. Sci. Nat.* 8: 31 (1847)

= *Leptothyrium dryadearum* Desm., *Ann. Sci. Nat.* 9: 277 (1848)

≡ *Marssonina potentillae* (Desm.) J.C. Fisch., in Rabenh., *Fungi Europ.* (1857)

≡ *Gloeosporium potentillae* (Desm.) Oud., *Ned. Kruidk.*

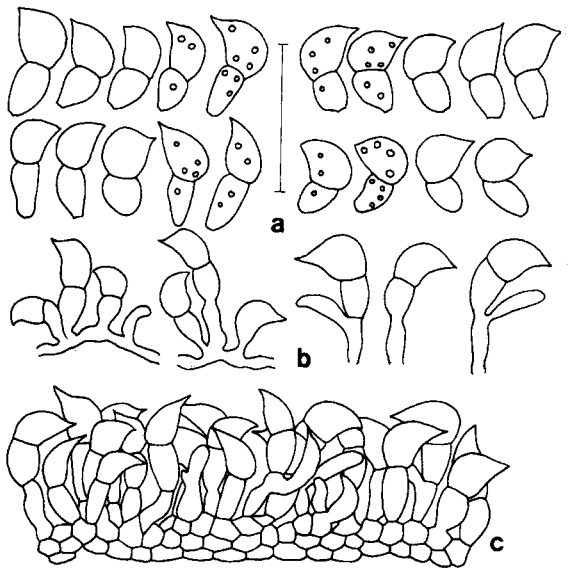

Fig. 5. *Marssonina fragariae* on *Potentilla fragarioides* var. *major*. (a) Conidia. (b) Conidiogenous cells with immature conidia. (c) Part of the acervulus. Bar = 30 μm. (H.T. Lee del.)

Arch., ser. II, 1: 259 (1873)

≡ *Marssonina potentillae* (Desm.) J.C. Fisch. var. *fragariae* Sacc., *Syll. Fung.* 13: 496 (1898)

≡ *Marssonina potentillae* (Desm.) Magnus, *Hedwigia* 45: 88 (1906)

≡ *Marssonina potentillae* (Desm.) Magnus f. *fragariae* (Lib.) Ohl, *Bot. Rast.* 4: 15 (1910)

= *Septoria potentillarum* Fuckel., *Jb. nassau. Ver. Naturk.* 196: 23 (1870)

= *Ascochyta fragariae* Sacc., *Michelia* 1: 169 (1877)

= *Ascochyta colorata* Peck, *Rept. N. Y. St. Mus.* 38: 94 (1884)

= *Marssonina fragariae* Sacc., *Malphigia* 10: 276 (1896)

Teleomorph: *Diplocarpon earlianum* (Ellis & Everh.) F.A. Wolf, *J. Elisha Mitchell Sci. Soc.* 39: 158 (1924)

Leaf spots amphigenous, discrete to confluent, discrete lesions 1~2 mm diam.; epigenous lesions initially reddish to brown, later with dark brown central area surrounded by yellowish halo, finally coalesced to give a burnt appearance to the plants; hypogenous lesions light brown to brown. **Mycelium** immersed, subhyaline, hyphae septate. **Conidiomata** acervular, amphigenous, discrete, but occasionally confluent, circular to subcircular, erumpent through the cuticle, dehiscent by irregular rupture of the cuticular layer, dark brown, 60~150 μm diam. **Conidiogenous cells** determinate, cylindric to irregular, simple to bifurcate, subhyaline to pale greenish, 3.2~10 × 2~3.2 μm. **Conidia** holoblastic, ovoid, slightly curved, unequally two-celled, upper cell larger, lower cell smaller, apex acute, base subtruncate to truncate, constricted at the septum, pale greenish to subhyaline, guttulate or eguttulate, upper cell with 1~4 oil drops, lower cell with 1~3 oil drops, 17.5~24 × 7.5~10 μm.

Habitat: On living leaves of *Duchesnea chrysantha* (Zoll. & Morr.) Miq., *Fragaria* × *ananassa* Duch., *Potentilla fragarioides* var. *major* Max. and *P. freyniana* Bornm. (Rosaceae).

Specimens examined: On *Duchesnea chrysantha*, SMK 15756 (5 V 1999, Samchok); on *Fragaria* × *ananassa*, SMK 16294 (12 VII 1999, Seoul), 16322 (18 VII 1999, Seoul); on *Potentilla fragarioides* var. *major*, SMK 11429 (30 X 1991, Kangnung); on *P. freyniana*, SMK 14908 (25 VII 1998, Kyongju).

Distribution: Africa (Republic of South Africa), America (Puerto Rico, U.S.A, Virgin Islands), Asia (China, India, Korea), Europe (United Kingdom), Oceania (Australia, New Guinea).

Notes: Chung *et al.* (1977) listed this species on *Fragaria* × *ananassa* for the first time in Korea. *Duchesnea chrysantha*, *Potentilla fragarioides* var. *major* and *P. freyniana* are added as new host records to Korea. The morphology in our specimens is similar to that were described by Sivanesan and Gibson (1976b) and Sutton (1980). However, the conidia are wider than the previous records.

6. *Marssonina juglandis* (Lib.) Magnus, *Hedwigia* 45: 88 (1906) Fig. 6

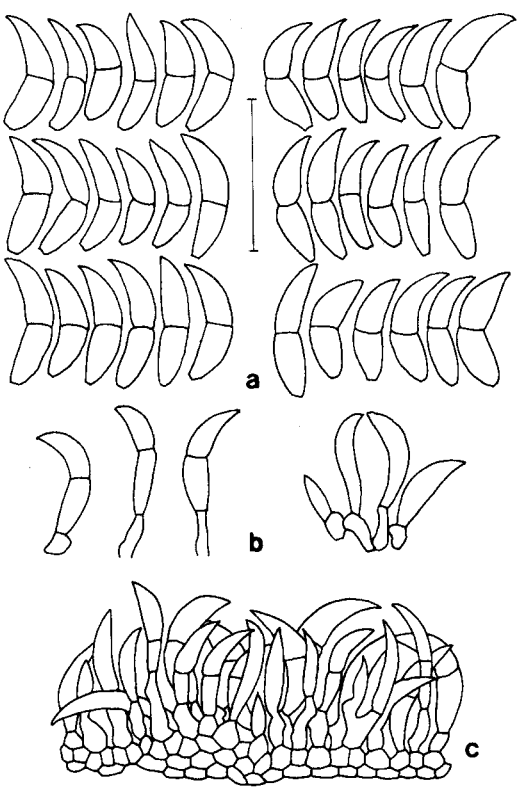

Fig. 6. *Marssonina juglandis* on *Juglans sinensis*. (a) Conidia. (b) Conidiogenous cells with immature conidia. (c) Part of the acervulus. Bar = 30 μm. (H.T. Lee del.).

≡ *Leptothyrium juglandis* Lib., *exs.* no. 164. *B. & Br. Ann. Nat. Hist.* 15: 33 (1848)

≡ *Gloeosporium juglandis* (Lib.) Desm. & Mont., *Ann. Sci. Nat.* 12: 296 (1849)

≡ *Marssonia juglandis* (Lib.) Sacc., *Syll. Fung.* 3: 768 (1884)

≡ *Marssoniella juglandis* (Lib). Höhn., *Sber. Akad. Wiss. Wien* 125: 108 (1916)

Teleomorph: *Gnomonia leptostyla* (Fr. : Fr.) Ces. & de Not., *Zeitschr. f. Planzenkr.* 16: 65 (1906)

Leaf spots amphigenous, discrete to confluent, circular, discrete lesions 1~10 mm diam.; epigenous lesions initially angular brown, later with white center surrounded by a dark brown margin, finally coalesced to give a burnt appearance to the plants; hypogenous lesions initially similar to epigenous lesions, later circular brown. **Mycelium** immersed, subhyaline, hyphae septate. **Conidiomata** acervular, amphigenous, but mostly epiphyllous, discrete, circular, erumpent through the cuticle, dehiscent by irregular rupture of the cuticular layer, dark brown to black, 100~225 μm diam. **Conidiogenous cells** determinate, cylindric to doliiform, subhyaline to pale greenish, 5~10 × 2~3.2 μm. **Conidia** holoblastic, cymbiform, crescent shaped, slightly curved to curved, equally to unequally two-celled, apex acute, base subtruncate to truncate, mildly constricted to non-constricted at the septum, subhyaline to pale greenish, eguttulate, 20~28 × 3~5 μm.

Habitat: On living leaves of *Juglans nigra* L. and *J. sinensis* Dode (Juglandaceae).

Specimens examined: On *Juglans nigra*, SMK 15048 (8 IX 1998, Suwon); on *J. sinensis*, SMK 15050 (8 IX 1998, Suwon).

Distribution: Africa (Republic of South Africa), Asia (China, Israel, Iran, Korea, Ukraine), Europe (Portugal, Spain), North and South America and Oceania (Australia).

Notes: In Korea, this species was first recorded as a causal agent of anthracnose of *J. sinensis* without mycological comments (Nakata and Takimoto, 1928). Since then, no additional record for the disease and its causal fungus has been made in Korea. *J. nigra* is newly added here as a host plant in Korea.

The conidia of the Korean collections are similar to those of previous records [20~25 × 5 μm in Saccardo (1889) and 18~21 × 3~4 μm in Saccardo (1892)].

7. *Marssonina rosae* (Lib.) Died., *Krypt. Fl. Mk. Brandenb.* 9: 830 (1915) Fig. 7

≡ *Asteroma rosae* Lib., *Mem. Soc. Linn.* 5: 404 (1827)

≡ *Actinonema rosae* (Lib.) Fr., *Summa Veg. Scand.* 424 (1849)

= *Dicoccum rosae* Bonord., *Bot. Zeit.* 282 (1853)

≡ *Marssonia rosae* (Bonord.) Briosi & Cav., *Funghi parassiti della coltivate od utile exs.* no. 97 (1889)

= *Marssonia rosae* Trail, *Fung. Inverar.* 46 (1889)

Teleomorph: *Diplocarpon rosae* F.A. Wolf, *Bot. Gaz.* 54: 231 (1912)

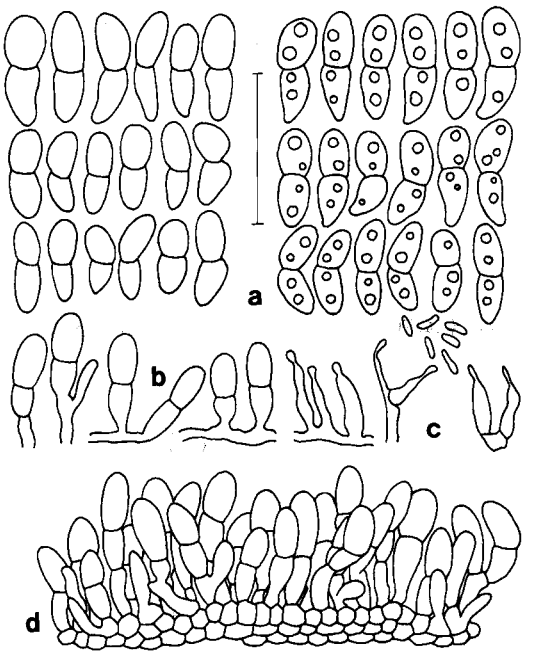

Fig. 7. *Marssonina rosae* on *Rosa hybrida*. (a) Conidia. (b) Conidiogenous cells with immature conidia. (c) Microconidia and conidiogenous cells. (d) Part of the acervulus. Bar = 30 μm. (H.T. Lee del.)

Leaf spots amphigenous, but chiefly epiphyllous, discrete to confluent, circular to radially fringed, often surrounded by chlorotic or yellowish discolorations, discrete lesions up to 15 mm diam.; epigenous lesions initially grayish brown, later dark brown to black; hypogenous lesions light brown to brown. **Mycelium** immersed, subhyaline to very pale brown, hyphae septate. **Conidiomata** acervular, amphigenous, but abundantly epiphyllous, discrete, subcircular to circular, erumpent through the cuticle, dehiscent by irregular rupture of the cuticular layer, brown, 50~150 μm diam. **Conidiogenous cells** determinate, cylindric, simple but occasionally bifurcate, hyaline to subhyaline, 2.1~5.3(~10.7) × 1~2.5 μm. **Conidia** holoblastic, obovoid, straight to slightly curved, unequally two-celled, apex obtuse, base subobtuse, constricted at the septum, subhyaline to pale greenish, but occasionally hyaline, guttulate or eguttulate, upper cells with (1~)2~3 oil drops, lower cells with 1~2 oil drops, (12.5~)14~22.5(~30) × 5~7.5 μm. **Microconidia** cylindric, obtuse at both end, hyaline, eguttulate, ca. 2~5 × 1 μm.

Habitat: On living leaves of *Rosa corymbosa* Moench, *R. davurica* Pall., *R. hybrida* Hort., *R. manettii* Bals.-Criv.:T. Rivers, *R. moyesii* Hemsl. & Wils. and *R. multiflora* Thunb. (Rosaceae).

Specimens examined: On *Rosa corymbosa*, SMK 15085 (11 IX 1998, Suwon); on *R. davurica* 15450 (9 X 1998, Chunchon), 15632 (3 XI 1998, Seoul); on *R. hybrida*, SMK 13354 (6 XI 1994, Kangnung), 13895 (2 VI 1997, Seoul), 13934 (6 VI 1997, Seoul), 13995 (24 VII 1997, Seoul), 14145 (14 XI 1997, Pusan), 14581 (30 VI 1998, Sungnam), 14597 (4 VI 1998, Seoul), 15163(19 IX 1998, Pusan), 15380 (8 X 1998, Suwon), 15593 (27 X 1998, Seoul), 15641 (4 XI 1998, Pochon), 15649 (7 XI 1998, Seoul), 15654 (13 XI 1998, Suwon), 15655 (13 XI 1998, Suwon), 15656 (13 XI 1998, Suwon), 15659 (13 XI 1998, Suwon), 15858 (23 V 1999, Sungnam), 16539 (2 IX 1999, Namyangju); on *R. manettii*, SMK 15089 (11 IX 1998, Suwon); on *R. moyesii*, SMK 17030 (12 X 1999, Suwon); on *R. multiflora*, SMK 11525 (17 XI 1991, Kangnung), 11548 (20 XI 1991, Kangnung), 13622 (4 VII 1995, Kangnung), 14616 (7 VI 1998, Yangku), 14889 (25 VIII 1998, Kyongju), 14944 (28 VIII 1998, Seoul), 15248 (25 IX 1998, Kangnung), 15495 (15 X 1998, Seoul), 15505 (20 X 1998, Seoul), 15594 (27 X 1998, Seoul), 16085 (21 VI 1999, Pusan), 16240 (7 VII 1999, Kangnung), 16510 (26 VIII 1999, Seoul).

Distribution: Worldwide where the hosts are cultivated or wild.

Notes: This species is well-known as a causal agent of black spot on *Rosa* species. Chung *et al.* (1977) first listed this fungus on *R. hybrida*, and Lee *et al.* (1989) made a brief morphological description based on material from Korea. The present study adds *R. corymbosa, R. davurica, R. manettii, R. moyesii* and *R. multiflora* as new host records to Korea.

8. *Marssonina sennenis* (Gonz. Frag.) Vassiljevsky & Karak., *Fungi Imperfecti Parasitici. II Melanconium.* p. 404 (1950) Fig. 8

≡ *Marssonia sennensis* Gonz. Frag., *Trab. Mus. Nac. Cienc. Nat. Madrid Ser. Bot.* 9: 90 (1916)

Leaf spots amphigenous, but chiefly epiphyllous, discrete, angular, 1~2 mm diam.; epigenous lesions initially brown without distinctive margins, later dark brown to black with central, grayish white, small spots; hypogenous lesions light brown to brown, usually vein-limited. **Mycelium** immersed, subhyaline to pale greenish, but occasionally brownish, hyphae septate. **Conidiomata** acervular, epiphyllous, discrete, circular to subcircular, erumpent through the cuticle, dehiscent by irregular rupture of the cuticular layer, brown, 50~180 μm diam. **Conidiogenous cells** determinate, cylindric, simple to bifurcate, subhyaline, 3.2~12.5 × 2.5~3 μm. **Conidia** holoblastic, obovoid, curved to slightly curved, unequally two-celled, upper cell larger, lower cell smaller with an appendage up to 10 μm long, apex subacute to acute, base subobtuse without appendages or developed into appendage, constricted at the septum, subhyaline to pale greenish, usually guttulate, two oil drops in upper cells, 22.5~35 × 6.2~7.5 μm.

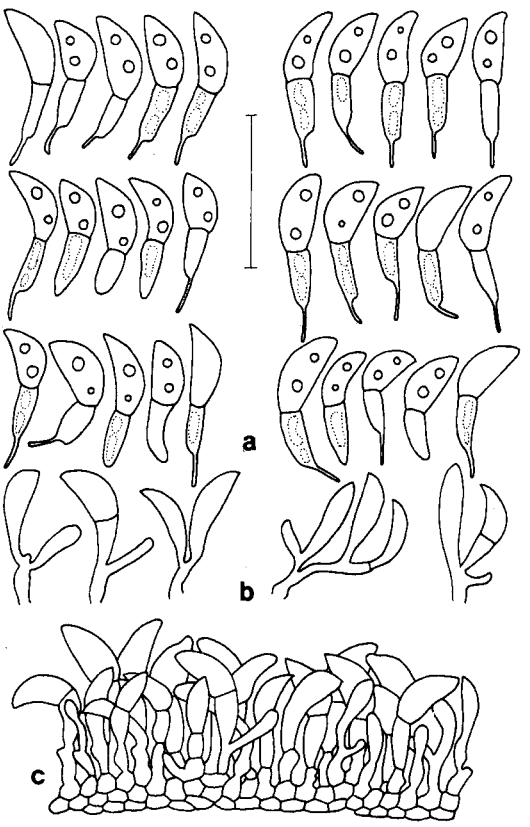

Fig. 8. *Marssonina sennenis* on *Sanguisorba officinalis*. (a) Conidia. (b) Conidiogenous cells with immature conidia. (c) Part of the acervulus. Bar = 30 μm. (H.T. Lee del.).

Habitat: On living leaves of *Sanguisorba officinalis* L. (Rosaceae).

Specimen examined: SMK 14761 (13 VIII 1998, Yangku).

Distribution: Asia (Korea, Mongolia), Europe (Spain) and North America (Alaska in USA).

Notes: Morphological characteristics of the Korean collection were in agreement with those of *Marssonia sennenis* as described in Saccardo (1931). Braun (1999) also recorded this fungus on *S. officinalis* from Mongolia. This fungus is characterized by a short appendage at the basal end of the conidia, two oil drops in the upper cells and two vacuoles in the lower cells of the conidia. This species is newly added to the mycological flora of Korea.

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