

New species and new records of several phytopathogenic hyphomycetes

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Abstract: Braun, U., Piątek, M. & Scheuer, C. 2013: New species and new records of several phytopathogenic hyphomycetes. *Schlechtendalia* **25**: 41–48.

The new species *Pseudocercospora lophostemonicola*, *Pseudocercospora alliicola* and *Ramularia rhopalostylidis* are described, illustrated and discussed. *Fusicladium tectonicola* on *Tectona grandis* is new for Cameroon and Ghana in Africa. *Pseudocercospora abelmoschi* on *Hibiscus esculentus* and *Pseudocercospora tandojamensis* on *Ziziphus spina-christi* are new records from Cameroon in Africa. *Cercospora corchori* on *Corchorus olitorius*, *Cercospora peristrophe* on *Peristrophe bicalyculata* and *Pseudocercospora pycnidioides* on *Smilax* sp. are new for Zambia in Africa. *Ramularia waldsteiniae*, described from North America, was found in Austria for the first time, as well as *Cladosporium phlei* on *Phleum pratense* and *Ramularia galii* on *Galium sylvaticum*. *Pseudocercospora ceratoniae* on *Ceratonia siliqua* is new for Portugal. *Ramularia lamii* var. *minor* on *Betonica* sp. is a new record for Slovenia. The specimens are kept in the herbaria HAL, GZU, KRAM and NZFRI.

Zusammenfassung: Braun, U., Piątek, M. & Scheuer, C. 2013: Neue Arten und Neufunde verschiedener phytopathogener Hyphomyzeten. *Schlechtendalia* **25**: 41–48.

Die neuen Arten *Pseudocercospora lophostemonicola*, *Pseudocercospora alliicola* und *Ramularia rhopalostylidis* werden beschrieben, abgebildet und diskutiert. *Fusicladium tectonicola* auf *Tectona grandis* ist neu für Kamerun und Ghana. *Pseudocercospora abelmoschi* auf *Hibiscus esculentus* und *Pseudocercospora tandojamensis* auf *Ziziphus spina-christi* sind Neufunde aus Kamerun in Afrika. *Cercospora corchori* auf *Corchorus olitorius*, *Cercospora peristrophe* auf *Peristrophe bicalyculata* und *Pseudocercospora pycnidioides* auf *Smilax* sp. sind neu für Sambia in Afrika. *Ramularia waldsteiniae*, beschrieben aus Nordamerika, wurde erstmals in Österreich gefunden, ebenso *Cladosporium phlei* auf *Phleum pratense* und *Ramularia galii* auf *Galium sylvaticum*. *Pseudocercospora ceratoniae* auf *Ceratonia siliqua* ist neu für Portugal. *Ramularia lamii* var. *minor* auf *Betonica* sp. ist neu für Slowenien. Das Belegmaterial befindet sich in den Herbarien HAL, GZU, KRAM und NZFRI.

Key words: *Cercospora*, *Cercospora*, *Cladosporium*, *Fusicladium*, *Pseudocercospora*, *Pseudocercospora*, *Pseudocercospora*, *Ramularia*, new species, new records, herbaria GZU, HAL, KRAM, NZFRI.

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Introduction

The present paper deals with miscellaneous plant pathogenic hyphomycetes from different countries examined in the course of routine studies of numerous micromycetes. Several specimens proved to be new, undescribed species or represent new records. Nearly all species concerned are cercosporoid and ramularioid hyphomycetes, i.e. they belong to the *Mycosphaerellaceae*. One species is cladosporioid, i.e. an anamorphic member of the *Cladosporiaceae* and one species is fusicladioid, i.e. an anamorphic member of the *Venturiaceae*. The new species are described, illustrated and discussed, *Fusicladium tectonicola* is illustrated, and the other new records are listed and briefly annotated.

Materials and methods

For scanning electron microscopy (SEM) of *Fusicladium tectonicola*, a leaf fragment with fungal infection was mounted on the carbon tab and fixed to an aluminium stub with double-sided transparent tape. The stub was sputter-coated with carbon using a Cressington sputter-coater and viewed under a Hitachi S-4700 scanning electron microscope, with a working distance of c. 11 mm. SEM micrographs were taken in the Laboratory of Field Emission Scanning Electron Microscopy and Microanalysis at the Institute of Geological Sciences of Jagiellonian University, Kraków (Poland).

Results

(1) New species

Pseudocercospora lophostemonicola U. Braun, sp. nov.

Fig. 1

MycoBank, MB 802481.

Pseudocercosporae sawadae valde similis, sed maculis foliorum valde distinctis et conidiis 3–10-septatis.

Leaf spots amphigenous, subcircular to angular-irregular, 0.5–2 mm diam. or confluent and somewhat larger, reddish to purplish violet, margin indefinite, later centre pale, brownish, with narrow darker border or surrounded by dark veins. Colonies amphigenous, mainly hypophyllous, rather inconspicuous. Mycelium internal and external, superficial hyphae emerging through stomata or arising from small substomatal stromatic hyphal aggregations, sparingly branched, 1.5–4 µm wide, septate, thin-walled, smooth, subhyaline to pale olivaceous. Stromata absent or small, substomatal, 10–20 µm diam., brown. Conidiophores usually solitary, arising from superficial hyphae, lateral and terminal, occasionally also in small, loose fascicles, arising from internal hyphae or substomatal stromata, erect, subcylindrical, straight to geniculate-sinuous, usually unbranched, 10–110 × 3–5(–6) µm, 0–7-septate, subhyaline, pale olivaceous to olivaceous-brown, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 10–30 µm long, conidiogenous loci inconspicuous, neither thickened nor darkened. Conidia solitary, obclavate, short conidia subcylindrical, rarely subacicular, 30–105 × 3–5 µm, 3–10-septate, subhyaline to pale olivaceous, thin-walled, smooth to faintly rough-walled, apex obtuse to subobtuse, rarely subacute, base short obconically truncate, 1.5–2 µm wide, hila unthickened, not darkened.

Holotype: on *Lophostemon confertus* (R. Br.) Peter G. Wilson & J.T. Waterh. (*Myrtaceae*), New Zealand, Auckland, Waikumete Cemetery, 8 July 2001, C.F. Hill 441 (HAL 2529 F).

Additional material examined (paratypes): on *Lophostemon confertus*, New Zealand, Auckland, Remuera, 23 Oct. 1991, D. Hayes (NZFRI 3427); Auckland, zoo, 12 June 2001, C.F. Hill (HAL 2530 F); on *Lophostemon* sp., New Plymouth, Te Hunui Cemetery, 13 Sep. 1994, B. Rogan (NZFRI 3540) and 29 Sep. 1999, B. Rogan (NZFRI 4015).

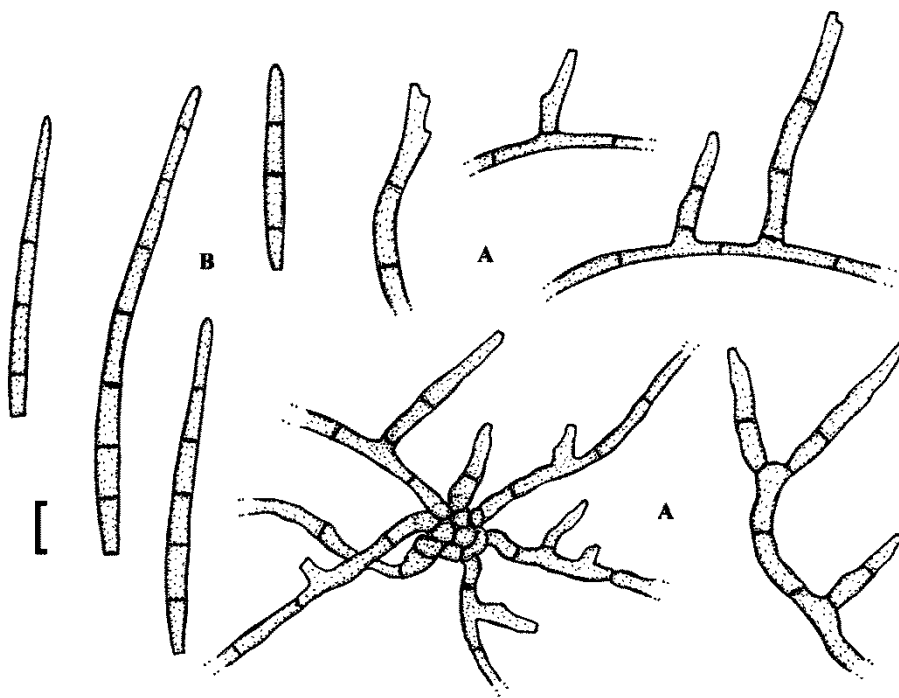


Fig. 1: *Pseudocercospora lophostemonicola*, A – Conidiophores, B – Conidia. Bar – 10 µm. U. Braun del.

Notes: Based on close morphological similarity, Braun (2001) and Braun et al. (2003) identified *Pseudocercospora* on *Lophostemon* in New Zealand as *P. sawadae* (W. Yamam.) Goh & W.H. Hsieh, a species described from Taiwan on *Psidium guajava* L. However, the two host genera, *Lophostemon* (*Myrtaceae* tribe *Lophostemoneae*) and *Psidium* (*Myrtaceae* tribe *Myrteae*), are not closely allied (Wilson et al. 2005). The true *P. sawadae*, which has often been confused with *P. psidii* var. *varians* U. Braun & Urtiaga (Braun & Urtiaga 2012), is possibly confined to Taiwan and endemic, whereas *Pseudocercospora* on *Lophostemon* is confined to New Zealand. In addition, there are some morphological differences. The lesions (leaf spots) caused by *Pseudocercospora* on *Lophostemon* are quite distinct from those of *P. sawadae* on *Psidium*, and the conidia are always solitary and up to 10-septate (usually 3–5-septate in *P. sawadae*, occasionally catenulate, Chupp 1954, Goh & Hsieh 1990). Therefore, collections on *Lophostemon* in New Zealand are considered to represent a separate species described as *Pseudocercospora lophostemonicola*.

***Pseudocercosporella alliicola* U. Braun & Scheuer, sp. nov.**

Fig. 2

Mycobank, MB 802483.

Pseudocercosporellae inconspicuae et *P. sublineolatae* similis, sed stromatibus brunneis et conidiis brevioribus et angustioribus, 15–60 × 2–3 µm.

Leaf spots amphigenous, relatively large blotches, up to 20 × 5 mm, or oblong, (or confluent) and larger, dingy greyish green to brown, margin indefinite. Caespituli amphigenous, punctiform, scattered to dense, dark brown, later greyish white by abundant conidial formation. Mycelium internal. Stromata small to well-developed, subcircular to somewhat irregular in outline, substomatal or occasionally intraepidermal, 10–70 µm diam., pale or yellowish brown, composed of swollen hyphal cells, 2–5 µm diam. Conidiophores in moderately large to very large fascicles, arising from stromata, erumpent or emerging through stomata, straight, sub-cylindrical or conical, straight to slightly geniculate-sinuuous, unbranched, short, 3–20 × 1.5–3 µm, aseptate, hyaline or subhyaline (with a pale greenish or very pale olivaceous tinge, especially near the base), thin-walled, smooth; conidiophores reduced to conidiogenous cells, conidio-genous loci inconspicuous, neither thickened nor darkened. Conidia solitary, cylindrical, sub-cylindrical, occasionally subacicular or narrowly obclavate, 15–60 × 2–3 µm, 0–4-septate, hyaline, thin-walled, smooth, apex obtuse to subacute, base truncate to short obconically truncate, 1.5–2 µm wide, hila unthickened, not darkened.

Holotype: on *Allium subhirsutum* L. (*Alliaceae*), Italy, Sardegna, Prov. Sàssari, Capo d'Orso E of Palau, c. 60–109 m alt., granite rock, maquis, 6 May 1986, C. Scheuer (GZU, Scheuer 6038).

Isotype: HAL 2531 F.

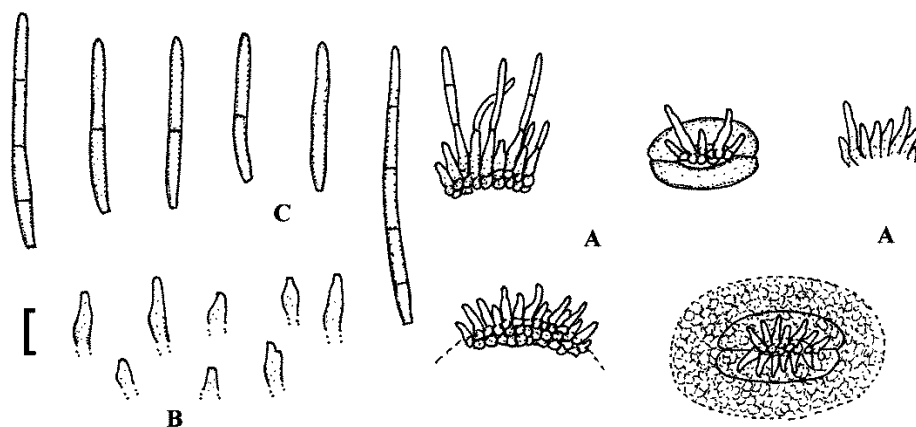


Fig. 2: *Pseudocercosporella alliicola*, A – Conidiophore fascicles, B – Conidiophores, C – Conidia. Bar – 10 µm. U. Braun del.

Notes: *P. alliicola* is the first species of *Pseudocercospora* on *Allium* and hosts of the *Alliaceae* at all. Among *Pseudocercospora* species on hosts belonging to the *Liliales* (*Liliaceae* s. lat.), there are two comparable species with large stromata and numerous short conidiophores, but *P. inconspicua* (G. Winter) U. Braun on *Lilium* spp. (*Liliaceae*) and *P. sublineolata* (Thüm.) U. Braun on *Veratrum* spp. (*Melanthiaceae*) differ from *P. alliicola* in having colourless or only pale stromata and much longer and somewhat wider conidia, up to $120(-150) \times 5(-6) \mu\text{m}$ (Braun 1995). *P. paridicola* H.D. Shin & U. Braun on *Paris verticillata* M. Bieb. (*Melanthiaceae*) in Korea differs in having small, colourless stromata and much larger conidia, $(35-60-150) \times 3.5-5 \mu\text{m}$ (Braun 1995). Due to its pigmented stromata and subhyaline conidiophores, *P. alliicola* is somewhat intermediate between *Pseudocercospora* and *Pseudocercospora*, but based on subhyaline conidiophores and hyaline conidia this species is better assigned to the latter genus.

***Ramularia rhopalostylidis* U. Braun, sp. nov.**

Fig. 5

Mycobank, MB 802484.

Leaf spots indistinct, yellowish to brownish discolorations. Caespituli amphigenous, punctiform, greyish white, effuse to aggregate. Mycelium internal. Stromata substomatal, 20–40 μm diam., at first hyaline, later pale to medium brown, composed of swollen hyphal cells, subcircular to somewhat angular in outline, 2–5 μm diam. Conidiophores in small to moderately large fascicles, loose to rather dense, arising from stromata, emerging through stomata, erect, subcylindrical-conical, straight to somewhat geniculate-sinuuous, unbranched, short, $5-25 \times 1-4 \mu\text{m}$, 0–1-septate, hyaline, thin-walled, smooth; conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–20 μm long, conidiogenous loci conspicuous, slightly thickened and darkened, 0.75–1.5 μm diam. Conidia catenate, in simple or branched chains, narrowly ellipsoid-ovoid to cylindrical, $6-15 \times (1.5-2-2.5(-3)) \mu\text{m}$, 0–1-septate, hyaline, thin-walled, smooth or almost so, somewhat attenuated towards both ends, hila slightly thickened and darkened, about 1 μm diam.

Holotype: on *Rhopalostylis sapida* (Sol. ex G. Forst.) H. Wedl. & Druce (*Areaceae*), New Zealand, Auckland, Mt. Albert, Carrington Road, Unitec, 12 Oct. 2008, C.F. Hill 4424 (HAL 2345 F).

Notes: There is no comparable species. This is the first *Ramularia* on a host belonging to the *Areaceae*.

(2) New records

***Cercospora corchori* Sawada, Spec. Bull. Agric. Exp. Station Formosa **19**: 667, 1919**

Material examined: on *Corchorus olitorius* L. (*Malvaceae*), Zambia, near the Victoria Falls, 13 Mar. 2006, C. Hahn, det. U. Braun (GZU, Scheuer 5132).

Notes: This is the first record for Zambia (Crous & Braun 2003).

***Cercospora peristrophes* Syd., in H. Syd. & Mitter, Ann. Mycol. **31**: 93, 1933**

Material examined: on *Peristrophe bicalyculata* Nees (*Acanthaceae*), Zambia, near the Victoria Falls, 13 Mar. 2006, C. Hahn, det. U. Braun (GZU, Scheuer 5131).

Notes: This species, hitherto only known from India and the Sudan, is new for Zambia (Braun 1995).

***Cladosporium phlei* (C.T. Greg.) G.A. de Vries, Contrib. Knowledge of the Genus *Cladosporium* Link ex Fries: 49, 1952.**

Material examined: on *Phleum pratense* L. (*Poaceae*), Austria, Steiermark (Styria), Graz, district Mariatrost, SSE of the terminal stop of tram line 1, $47^{\circ}06'14''\text{N}$, $15^{\circ}29'28''\text{E}$, 410 m alt., 19 June 2008, C. Scheuer, conf. U. Braun (GZU, Scheuer 5442).

Notes: This is apparently the first published record from Austria (Bensch et al. 2012).

Fusicladium tectonicola (Y.H. He & Z.Y. Zheng) U. Braun & Bensch, *Studies in Mycology* **72**: 332, 2012. Figs 3–4

≡ *Cladosporium tectonicola* Y.H. He & Z.Y. Zheng, *Mycosystema* **21**: 21, 2002.

= *Cladosporium tectonae* Sawada, *Rep. Gov. Res. Inst. Formosa* **85**: 92, 1943, nom. inval.

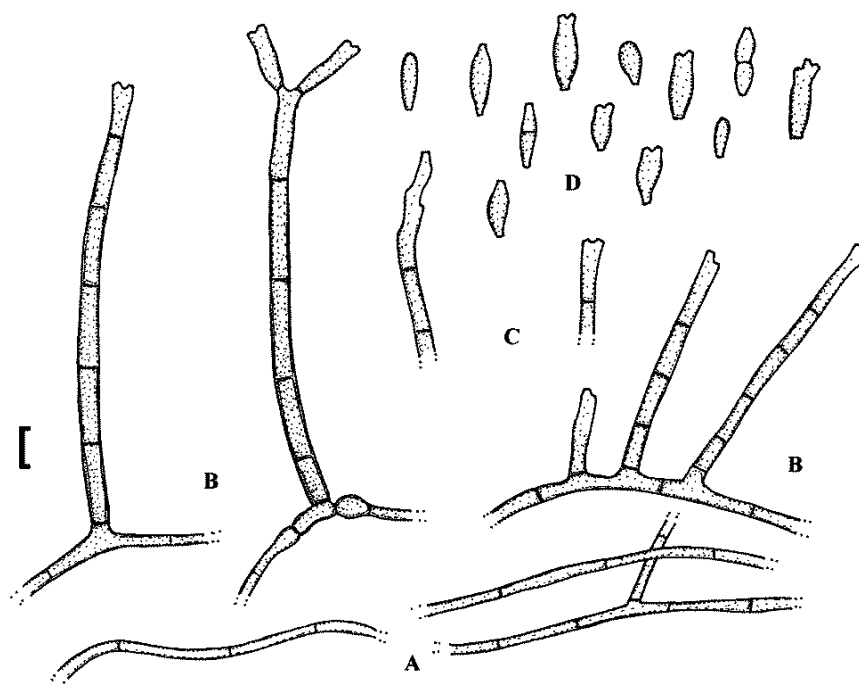


Fig. 3: *Fusicladium tectonicola*, A – Superficial hyphae, B – Conidiophores, C – Conidiophore tips, D – Conidia. Bar – 10 μ m. U. Braun del.

Material examined: on *Tectona grandis* L. f. (*Lamiaceae*), Cameroon, East Region, Dept. of Lom-et-Djérem, between Gamboula and Bazzama, c. 23 km E of Bertoua, c. 690 m alt., 4 Dec. 2007, J. & M. Piątek (KRAM F-49433 and HAL 2526 F); Ghana, Brong-Ahafo Region, Kintampo South District, between Kintampo and Jema, c. 300 m alt., 10 Nov. 2012, M. Piątek & N.S. Yorou (KRAM F-49431 and HAL 2533 F).

Notes: *Cladosporium tectonicola* was described from China on *Tectona grandis*. The present collections from Cameroon and Ghana represent the first African records of this species. Based on truncate, unthickened, non-cladosporioid conidiogenous loci and hila, Bensch et al. (2012) reallocated *C. tectonicola* to *Fusicladium* and provided a full description, but no illustration.

Pseudocercospora abelmoschi (Ellis & Everh.) Deighton, *Mycological Papers* **140**: 138, 1976

Material examined: on *Hibiscus esculentus* L. (*Malvaceae*), Cameroon, Centre Region, Dept. of Mbam-et-Inoubou, at the Sanaga river near Ebebda, c. 60 km NW from Yaoundé, c. 390 m alt., 4 Mar. 2007, J. & M. Piątek (with A.L. Njouonkou, C. & K. Vánky) (KRAM F-49429, GZU000296021, HAL 2534 F).

Notes: This is the first record of *Pseudocercospora abelmoschi* from Cameroon (Crous & Braun 2003).

Pseudocercospora ceratoniae (Pat. & Trab.) Deighton, *Mycological Papers* **140**: 141, 1976

Material examined: on *Ceratonia siliqua* L. (*Caesalpiniaceae*), Portugal, Algarve Region, Carvoeiro, c. 33 m alt., 25 Jan. 2008, M. Piątek & J.J. Wójcicki (KRAM F-49430, GZU000296022, HAL 2535 F).

Notes: This is the first record of *Pseudocercospora ceratoniae* from Portugal (Crous & Braun 2003).

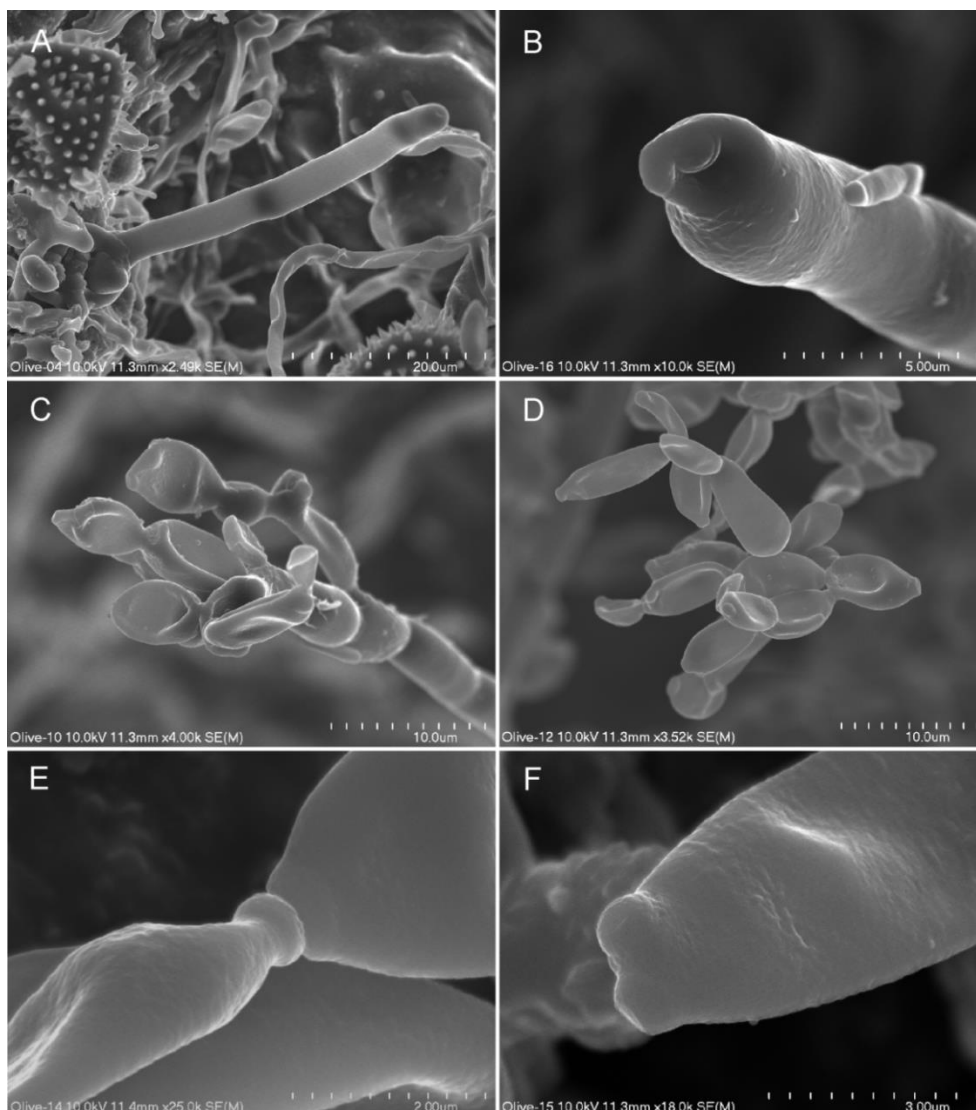


Fig. 4: *Fusicladium tectonicola* (KRAM F-49433) observed in scanning electron microscopy, A – Conidiophore emerging through stomata, B – Conidiogenous loci, C–D – Conidia, E – Connection of two conidia, F – Conidial hila.

Pseudocercospora pycnidioides (Chupp) U. Braun & Crous, in Crous & Braun, *Mycosphaerella* and its anamorphs: 1. Names published in *Cercospora* and *Passalora*. CBS Biodiversity Ser. (Utrecht) **1**: 345, 2003.

Material examined: on *Smilax* sp. (*Smilacaceae*), Zambia, near the Victoria Falls, 13 Mar. 2006, C. Hahn, det. U. Braun (GZU, Scheuer 5138).

Notes: This collection represents a new record for Africa. So far, *Pseudocercospora pycnidioides* was only known from Brazil and India (Crous & Braun 2003).

Pseudocercospora tandojamensis (S.A. Khan & M. Mandal) U. Braun & Crous, *Mycosphaerella* and its anamorphs: 1. Names published in *Cercospora* and *Passalora*. CBS Biodiversity Series **1**: 397, 2003

≡ *Cercospora tandojamensis* S.A. Khan & M. Mandal, Mycopathol. Mycol. Appl. **52**: 26, 1974.

Material examined: on *Ziziphus spina-christi* (L.) Desf. (*Rhamnaceae*), Cameroon, East Province, Dept. Lom et Djérem, Letta, c. 41 km NE from Bertoua, c. 765 m alt., 14 Dec. 2007, J. & M. Piątek (KRAM-F-49428, GZU000296023, HAL 2527 F).

Notes: This species, hitherto only known from the type collection on *Ziziphus nummularia* (Burm. f.) Wight & Arn. in Pakistan (Crous & Braun 2003), is new to Africa and was found on a new host species.

Ramularia galii Chevassut, Bull. Soc. Mycol. Fr. **108**: 103, 1992

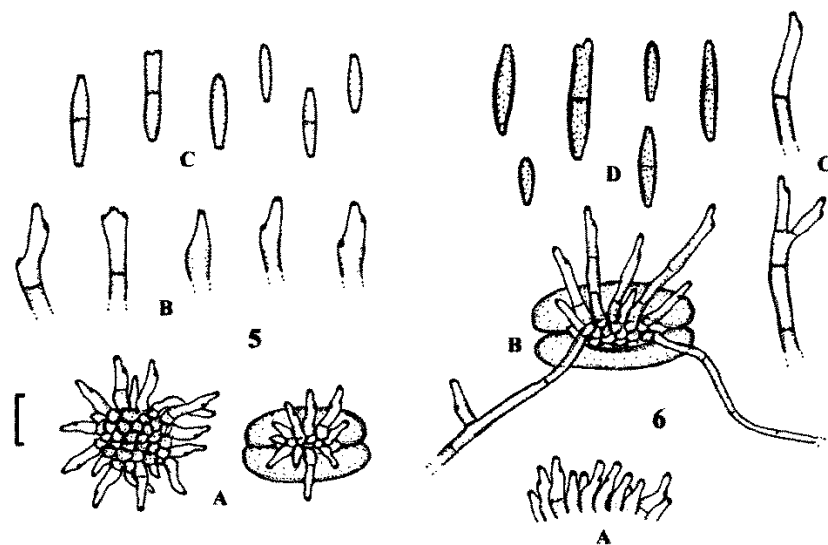
Material examined: on *Galium sylvaticum* L. (*Rubiaceae*), Austria, Steiermark (Styria), Grazer Bergland, Schöckl area, Stattegg N of Graz-Andritz, in the lowest part of the ravine Falschgraben, E above the settlement Hub, c. 480 m alt., 47°08,6'N, 15°25,4'E, 24 Sep. 1999, C. Scheuer, det. U. Braun (GZU, Scheuer 3808).

Notes: This is the first record of *Ramularia galii* from Austria (Braun 1998).

Ramularia lamii var. *minor* U. Braun, A Monograph of *Cercospora*, *Ramularia* and Allied Genera (Phytopathogenic Hyphomycetes) **2**: 185, 1998

Material examined: on *Betonica* sp. (*Lamiaceae*), Slovenia, Kras, Divača, doline "Risnik" S of Divača, NW edge of the doline, c. 430 m alt., 45°41'N, 13°58'30"E, 9 Apr. 1999, C. Scheuer, det. U. Braun (GZU, Scheuer 3845).

Notes: This is the first record of *Ramularia lamii* var. *minor* from Slovenia (Braun 1998).



Figs 5–6: 5 – *Ramularia rhopalostylidis*, A – Conidiophore fascicles, B – Conidiophores, C – Conidia; 6 – *Ramularia waldsteiniae*, A – Conidiophore fascicle, B – Conidiophores and superficial hyphae emerging through a stoma, C – Conidiophores, D – Conidia. Bar – 10 μ m. U. Braun del.

Ramularia waldsteiniae Ellis & Davis, Trans. Wisconsin Acad. Sci. **14**: 99, 1903 Fig. 6

Material examined: on *Waldsteinia lobata* (Baldw.) Torr. & A. Gray (*Rosaceae*), Austria, Steiermark, Graz, Geidorf, Karl Franzens University, botanical garden, temperate greenhouse, c. 380 m alt., 31 Mar. 2009, H. Teppner (GZU, Scheuer 5591; HAL 2532 F) [origin of the host plants – USA, South Carolina, Oconee Co., S side of Brasstown Creek, NNE of Forest Rd. 751, 4 Mi W of RT 76, c. 700–800 m alt., scrub of *Rhododendron maximum*, 12 June 2007, W. Schuehly & S. Crockett; live plant, received 19 June 2007].

Note: This is the first record of *Ramularia waldsteiniae* from Europe, and we may assume that the fungus was introduced to this greenhouse together with a live host plant imported for chromosome counts (Teppner et al. 2009).

In his monograph of *Ramularia*, Braun (1998) reduced *R. waldsteiniae*, described from North America, to synonymy with *R. grevilleana* (Tul. & C. Tul.) Jørst. However, in the present collection some superficial hyphae with solitary conidiophores have been observed, which were absent in type material of this species, examined by Braun (1998). The conidia on *Waldsteinia* are on average somewhat shorter and narrower compared with *R. grevilleana*. Therefore, *R. waldsteiniae* should be maintained as a separate species, at least tentatively. Inoculation experiments and/or molecular sequence analyses are necessary within the *R. grevilleana* complex for final conclusions about species concepts and synonymy. The Austrian material is

characterised as follows: Leaf spots large, irregularly shaped, up to 2.5 cm diam., brown, somewhat zonate, often with purplish violet margin or halo. Caespituli hypophyllous, punctiform to confluent, subeffuse, greyish white. Mycelium internal and partly external, superficial hyphae emerging through stomata, arising from substomatal hyphal aggregations, sparingly branched, 1–3 µm wide, hyaline, septate, thin-walled, smooth. Stomata lacking or small, formed as substomatal hyphal aggregations, 5–20 µm diam., colourless to pale yellowish ochraceous. Conidiophores in small to moderately large fascicles, loose to rather dense, arising from internal hyphae or stomata, emerging through stomata, or solitary, arising from superficial hyphae, lateral and terminal, erect, subcylindrical, straight to somewhat geniculate-sinuuous, mostly simple, occasionally irregularly branched, 5–25(–40) × 1.5–3 µm, 0–3-septate, hyaline, thin-walled, smooth. Conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, 5–20 µm long, conidiogenous loci conspicuous, thickened and darkened, 0.75–1 µm diam. Conidia catenate, in simple or branched chains, narrowly ellipsoid-ovoid, fusiform, subcylindrical, 5–25 × 2–3 µm, 0–1-septate, hyaline, thin-walled, verruculose, somewhat narrowed towards base and apex, rounded to subtruncate, hila slightly thickened and darkened, 0.75–1 µm wide.

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