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Phoma recepii sp. nov. from the *Caloplaca cerina* group in Turkey

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Abstract — *Phoma recepii* is described from the apothecia of epiphytic *Caloplaca cerina* and *C. monacensis* in the western part of Turkey. The new species is characterized by having the narrowest conidia amongst the lichenicolous *Phoma* species. *Phoma caloplacae* is reported from Turkey for the first time.

Key words — biodiversity, coelomycetes, lichens, mitosporic fungi, *Teloschistaceae*

Introduction

Phoma Sacc. comprises approximately 220 species, most of which are plant pathogens, endophytes, or saprophytes (Boerema et al. 2004). Within this large genus, 23 species are obligately lichenicolous (Hawksworth 1981, Hawksworth & Cole 1994, Diederich et al. 2007, Brackel 2008, Kondratyuk et al. 2010, Lawrey et al. 2012). According to Lawrey et al. (2012), the multilocus phylogeny of *Phoma* places this genus in the *Phaeosphaeriaceae* (*Pleosporales*, *Dothideomycetes*).

Of the 182 species of lichenicolous fungi known from Turkey (Halıcı et al. 2012), only one *Phoma* species, *P. peltigerae* (P. Karst.) D. Hawksw. on *Peltigera* spp., has been reported from the country (Candan et al. 2010; Halıcı et al. 2012). During the Turkish *Teloschistales* project we discovered a new *Phoma* species on the apothecia of *Caloplaca cerina* and *C. monacensis*, and found *P. caloplacae* for the first time in Turkey.

Material & methods

Sections were prepared by hand and examined in I [Lugol's iodine (Merck 9261) with (KI) and without (I) pre-treatment with 10% KOH], 10% KOH, cotton blue, and water.

Conidia and pycnidia, which were measured in water, are given as: (min–)X–sd–*X*–X+sd(–max.), where 'min.' and 'max.' represent the extreme values, 'X' the arithmetic mean, and 'sd' the corresponding standard deviation. The microphotographs were taken with a Leica DFC 420 digital microscope camera with a c-mount interface and with a 5 megapixel CCD. The type of the new species is deposited in Erciyes University Herbarium Kayseri, Turkey (EUH).

Taxonomy

Phoma recepii Halıcı & Candan, **sp. nov.** FIGURE 1

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Differs from all lichenicolous *Phoma* species in having the narrowest conidia.

TYPE: Turkey, Denizli, south-east of Honaz Mount National Park, northwest of Tavas, 37°41′N 29°15′E, alt. 1750 m, *Juniperus* communities, calcareous motherrock, on apothecia of *Caloplaca monacensis* on *Juniperus* sp., 5 July 2012, M.G. Halıcı & M. Candan (**Holotype**, EUH (MGH 0.3441)).

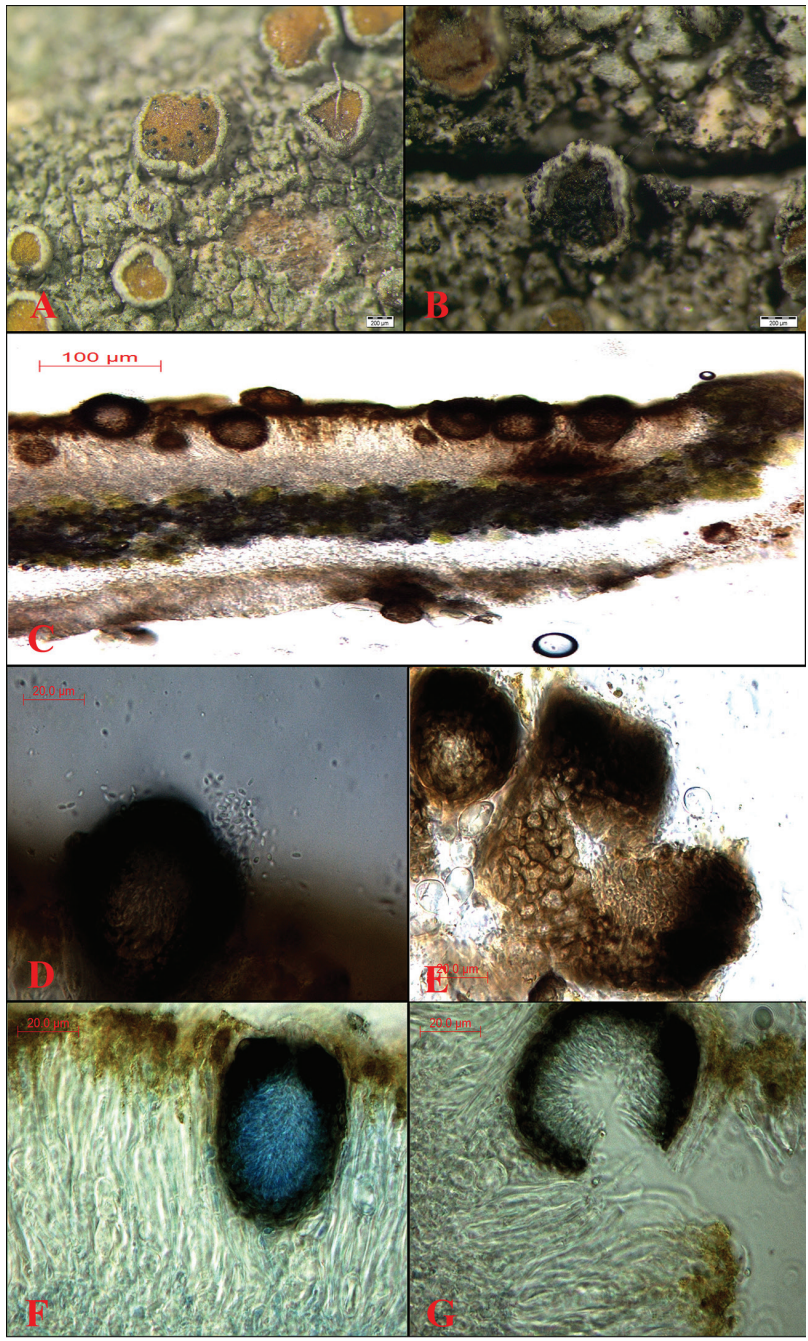
ETYMOLOGY: The epithet honors Recep Yazıcıoğlu, the former governor of Denizli Province, who was known as "Super Governor" by the public and was killed in a traffic accident in 2 September 2003.

Conidiomata pycnidial, first immersed in the apothecia of the host lichen (*Caloplaca cerina, C. monacensis*), but at maturity becoming partially erumpent, scattered, black in macroscopical view, in section brown in lower parts and dark brown in the upper parts, covered by a hyaline gelatinous sheath, subglobose to almost globose, (50–)54.5–*62*–69(–80) × (42–)46.5–*50*–55(–65) µm (n = 20), ostiolate, ostiole c. 10 µm diam; pycnidial wall 8–14 µm thick, composed of 2–3 layers of pseudoparenchymatous cells, mainly polyhedral but some globose, outer cells brown, about 4.5–7.5 × (3–)4–5(–6.5) µm, inner ones hyaline, 4–7 µm thick. Cells near the ostiole have a darker brownish tinge. Conidiogenous cells lining the inner wall of the pycnidial cavity, short ampulliform to subglobose, hyaline, smooth-walled, 6–9 × 3.5–5.5 µm, conidiogenesis enteroblastic. Conidia abundantly produced, arising singly, narrowly ellipsoid to almost bacilliform, rounded at the ends, hyaline, simple, smooth-walled, 2.5–*3*–3.5 × 1 µm (n = 100).

ADDITIONAL SPECIMEN EXAMINED: **TURKEY**, **MANISA**, Akhisar, south-west of Dağdere Village, 38°58′N 28°01′E, alt. 855 m, *Juniperus* communities, calcareous motherrock, on apothecia of *Caloplaca cerina* on *Juniperus* sp., 30 July 2012, M.G. Halıcı & M. Candan (MGH 0.3443).

ECOLOGY & DISTRIBUTION: *Phoma recepii* is currently known only from two localities in the inner parts of Aegean Region, Turkey on the apothecia

FIG. 1. ***Phoma recepii*** (Holotype, MGH 0.3441): A, B, Infected apothecial discs of the host lichen *Caloplaca monacensis*; C, F, Pycnidia immersed in the hymenium of the host lichen (F in cotton blue); D, Conidia; E, Surface view of pycnidial wall; G, Conidiogenous cells making a line inside the pycnidia.


A
B
100 µm
C
20.0 µm
D
20.0 µm
E
20.0 µm
F
20.0 µm
G

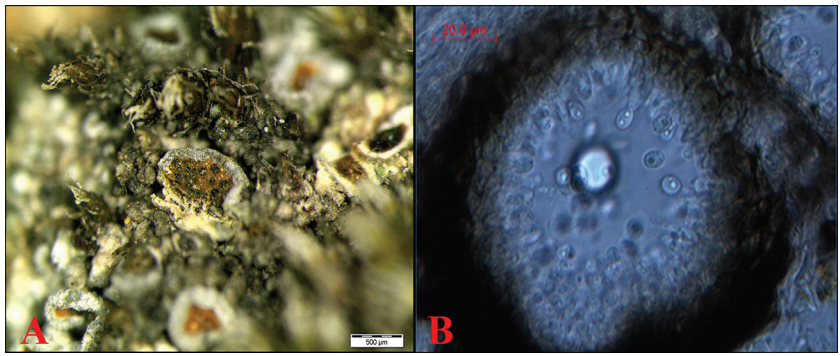


Fig. 2. ***Phoma caloplacae*** (MGH 0.7216): A, Infected apothecial disc of the host lichen *Caloplaca stillicidiorum*; B, Conidiogenous cells and conidia.

of *Caloplaca cerina* and *Caloplaca monacensis* on bark of *Juniperus* spp. at high elevations (850–1750 m). The species seems to be weakly pathogenic in the beginning, as the infected apothecial discs of the host lichen become discoloured and brownish. Also as seen in the section, ascospore production appears to be inhibited in infected parts of the hymenium. Finally it completely damages the infected apothecia of the host lichen. As the host lichen has a wide distribution in the northern hemisphere, *P. recepii* may have a similarly wide distribution.

Notes: Four *Phoma* species (*P. caloplacae*, *P. fuliginosa*, *P. pisutii*, *P. xanthomendozae*) have previously been described on the apothecia of members of the *Teloschistales,* all of which have longer and wider conidia than *P. recepii* (Table 1).

Similar to *P. recepii, P. caloplacae* D. Hawksw. grows in the hymenium of *Caloplaca cerina* but clearly differs from *P. recepii* in producing subglobose conidia (Hawksworth 1981). We also collected *P. caloplacae* in the central part of Anatolia on apothecia of *Caloplaca stillicidiorum* (Figure 2), which represents a new species record for Turkey:

> *Phoma caloplacae* specimens examined: **Turkey**, **Kayseri**, İncesu, Gökdağ, Western slopes of Mount Erciyes, 38°34′N 35°19′E, alt. 1750 m, crevices of siliceous rocks, on apothecia of *Caloplaca stillicidiorum* on mosses, 24 July 2003, M.G. Halıcı (MGH 0.7216); **Konya**, Seydişehir, Seydişehir-Beyşehir highway, NW of Nohuttaş Position, 37°29′N 31°49′E, alt. 1200 m, crevices of siliceous rocks, on apothecia of *Caloplaca stillicidiorum* on mosses, 14 June 2013, M.G. Halıcı & M. Candan (MGH 0.7217).

Phoma fuliginosa M.S. Cole & D. Hawksw., described on the apothecia of *Xanthomendoza trachyphylla* from USA (Nebraska), has larger and longer conidiogenous cells and conidia (Hawksworth & Cole 2004). *Phoma pisutii*

Table 1. Comparison of *Phoma* species growing on *Teloschistales* members

Species	Conidiomata (µm)	Conidiogenous cells (µm)	Conidia (µm)	Reference
P. caloplacae	50–130	5–6	4–7	Hawksworth (1981)
P. fuliginosa	50–75	5–7.5 × 3–6	5–6.5 × 3	Hawksworth & Cole (1994)
P. pisutii	110–175	3.5–4.5 × 2.5–3.5	4–7 × 2–3	Kondratyuk et al. (2010)
P. recepii	50–80 × 42–65	6–9 × 3.5–5.5	2.5–3–3.5 × 1	Present paper
P. xanthomendozae	140–160	5–10 × 2.5–3.5	4.5–8.5 × 3–4.5	Lawrey et al. (2012)

S.Y. Kondr. et al., described on *Xanthomendoza ulophyllodes* from Ukraine and USA, has much larger pycnidia and wider conidia (Kondratyuk et al. 2010). *Phoma xanthomendozae* Diederich & Freebury, recently described on *Xanthomendoza hasseana* and *X. montana* from Canada, has much larger pycnidia and wider conidia (Lawrey et al. 2012).

Phoma recepii has the narrowest conidia among the lichenicolous *Phoma* species. *Phoma lecanorina* Diederich, which has pycnidia immersed in the host thallus of *Lecanora expallens*, has longer and slightly wider conidia (3.2–5 × 1.2–1.6 µm) and smaller pycnidia (15–60 µm; Diederich 1986). *Phoma puncteliae* Diederich & Lawrey, described on *Punctelia rudecta* from USA, has smaller pycnidia (40–60 µm) and wider conidia ((2.3–)2.5–3(–3.1) × (1.9–)2–2.4(–2.5) µm; Lawrey et al. 2012). *Phoma everniae* D. Hawksw., a minute species known on older basal fronds of *Evernia prunastri* in UK, has smaller pycnidia ((20–)30(–35) µm in diam.) and longer and slightly wider conidia (4.5–5 × 1–1.5 µm; Hawksworth 1994). *Phoma dubia* (Linds.) Sacc. & Trotter, a species known on *Usnea* spp. in New Zealand, has longer and slightly wider conidia (3.5–5 × 1.5–2 µm) and possesses golden brown cells with thicker walls near the ostiole (Hawksworth 1981).

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