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SOME OVERLOOKED AND RARE XYLARIACEOUS FUNGI FROM POLAND

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Abstract. Six xylariaceous fungi are reported from Poland: *Biscogniauxia marginata* (Fr.) Pouzar, *Cainia graminis* (Niessl) Arx & E. Müll., *Camarops plana* Pouzar, *Camarops tubulina* (Alb. & Schwein.) Shear, *Daldinia fissa* C. G. Lloyd and *Rosellinia corticium* (Schw.) Sacc. The morphological characters of the stromata are described, and xylariaceous species reported from Poland are listed.

Key words: Xylariales, *Biscogniauxia*, *Cainia*, *Camarops*, *Daldinia*, *Rosellinia*, distribution

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INTRODUCTION

The order Xylariales Nannf. comprises about 800 species. These fungi include parasites, saprotrophs and coprophilous species, as well as species associated with ant and termite nests (Rogers 1979, 2000). It is well known that these mostly wood-inhabiting fungi possess anamorphs which often occur as endophytes in herbs, shrubs and trees (Petrini & Petrini 1985; Chapela *et al.* 1993; Rodrigues *et al.* 1993; Whalley 1996). Xylariaceous fungi in the sense accepted by Kirk *et al.* (2001) have been noted in Poland by a great many mycologists, including Eichler (1907), Schroeter (1908), Namysłowski (1909), Truszkowska (1960, 1965, 1967, 1974, 1977), Chlebicki (1990, 2002, 2005a, b), Chlebicki and Krzyżanowska (1995), Chlebicki *et al.* (1996), and Kwaśna and Łakomy (2002). Presently known in Poland are 115 species of Xylariales, seven species of Boliniales, and three species of uncertain systematic position (*incertae sedis*; see Appendix). Among them are very rare species such as *Wawelia regia* Namysł. described by Namysłowski (1909), *Camarops tubulina* (Alb. & Schwein.) Shear noted by Schroeter (1908), *Hypoxylon terricola* J. H. Mill. isolated from soil by Truszkowska and Dorenda (1982), *Diatrype rappazii* (Chleb.) Lar. N. Vassiljeva noted in Białowieża by Chlebicki and Krzyżanowska [1995, as *Diatrype subaffixa* (Schwein.) Cooke var. *rappazii* Chleb.], and *Xylaria oxyacanthae* Tul. & C. Tul. recently noted by Kujawa and Karasiński (2007) on fruits of *Crataegus monogyna* Jacq. Other new xylariaceous taxa described from Poland have turned out to be synonyms: *Xylaria polonica* Błoński (Błoński 1889) noted on dead *Carabus* sp. is in fact *Cordyceps cinerea* (Tul. & C. Tul.) Sacc. (Saccardo 1897); and *Diatrypella favacea* subsp. *nespiakii* Chleb. is a synonym of *Diatrypella moravica* Petr. & Keissl. (Chlebicki & Krzyżanowska 1995). *Rosellinia chaetomioides* J. Schröt. noted by Schröter (1908) on cow excrement has not been confirmed after the original description, and its taxonomic status is not known. Thus this fungus was not mentioned by Petrini (1993) in her monograph.

Some common species such as *Xylaria polymorpha* (Pers.) Grev., *X. hypoxylon* (L.) Grev., *Kretzschmaria deusta* (Hoffm.) P. M. D. Martin, *Hypoxylon fragiforme* (Pers.) J. Kickx f. and *H. fuscum* (Pers.) Fr. have been reported in many floristic works. The present article discusses some xylariaceous fungi new to or very rare in Poland.

Material and methods

The present study is based on specimens collected by the author or colleagues and deposited in KRAM F and PRM. Stroma morphology was examined under a Nikon SMZ 1500 stereomicroscope. Asci and ascospores were examined in a water drop under a Nikon Labophot 2 light microscope with an oil-immersion lens at 1000×. Twenty spores of each specimen were measured. Slides in lactophenol were prepared for LM photography under an Olympus BX-51 light microscope. Host plants were identified from Schweingruber's *Anatomy of European Woods* (Schweingruber 1990).

Results and discussion

Biscogniauxia marginata (Fr.) Pouzar Fig. 1A

Česká Mykol. **33**: 216. 1979.

Stroma distinctly raised, with black stromatic zone (dorsal zone) extending down to the wood, surface blackish, circular to elliptic, 3–5 mm in diameter, up to 3 mm high, upper surface slightly concave, margin regularly circular, raised, ostioles slightly lower than stromatal surface, surrounded by whitish substance. Asci cylindrical, 160–174 × 12–15 µm, *pars sporifera* 112–124 × 12–15 µm, ascospores dark brown, subglobose, smooth, 13–15 × 9.5–11 µm.

Specimens examined. POLAND. Sudetes, Góry Sowie Mts, Zagórze Śląskie, in beech forest near medieval castle, on dead branch of *Sorbus aucuparia* L., June 1996, *leg. A. Chlebicki & J. Rukšeniene* (KRAM F-54918); CZECH REPUBLIC. Central Bohemia, Český Kras, NNE of Srbsko, Doutnáč hill, on dead twig of *Carpinus betulus* L., 16 Apr. 2005, *leg. M. Suková* (KRAM F-54852).

Notes. Only two species of *Biscogniauxia* Kuntze have been reported from Poland so far: *Biscogniauxia nummularia* (Bull.) Kuntze on *Fagus sylvatica* L. (Eichler 1907; Schroeter 1908; Domański *et al*. 1970) and *Biscogniauxia repanda* (Fr.) Kuntze on *Sorbus aucuparia* (Eichler 1907; Chlebicki & Bujakiewicz 1994; Chlebicki 2005a). Recently (15 June 2005), Dr. Włodzimierz Kita found another locality of *B. marginata* in the Wzgórza Trzebnickie hills in Osolin near Oborniki Śląskie on a dead branch of *Sorbus aucuparia*. *Biscogniauxia marginata* is known from Europe, Asia and North America (Pouzar 1986a; Granmo *et al*. 1989; Ju *et al.* 1998), and is reported here for the first time from Poland.

Cainia graminis (Niessl) Arx & E. Müll.

Acta Bot. Neerl. **4**(1): 112. 1955.

Stromata subglobose, immersed in plant tissues with minute clypeus. Asci 220–260 × 15–12 µm, *pars sporifera* 180–190 × 15–12 µm, ascospores ellipsoidal, brown, two-celled (33–)38–44 × 10–12 µm, with six ridges on the spores, whole spore surrounded by a slimy sheath, *ca* 5 µm thick.

Specimens examined. POLAND. Tatra National Park, Grzędy near Ciemniak Mt., on dead leaves of *Carex firma* Host, 18 Oct. 1989, *leg. A. Chlebicki* (KRAM F-55320); KAZAKHSTAN. Tian Shan, Zailijskij Alatau Mts, Issyk valley, elev. 3444 m a.s.l., 43°07′52.5″N, 77°30′25″E, on stems and leaves of *Carex griffithii* Boott and *Festuca coelestis* (St.-Yves) Krecz. & Bobr., 3 Aug. 2005, *leg. A. Chlebicki* (KRAM F-55452, 55819).

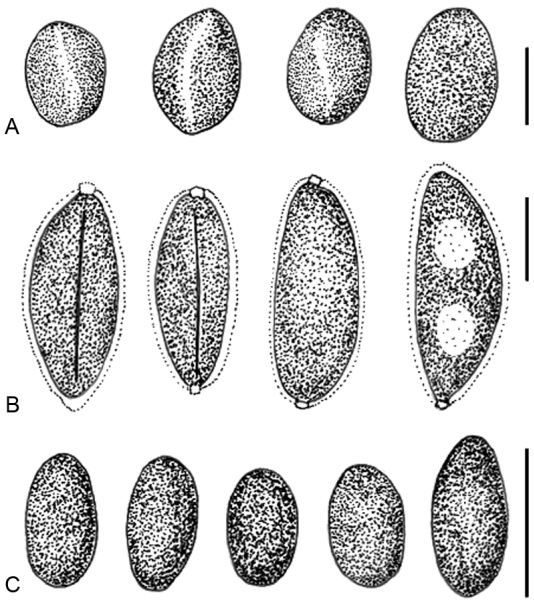

Fig. 1. Ascospores. A – *Biscogniauxia marginata* (Fr.) Pouzar (KRAM-F 54852), B – *Rosellinia corticium* (Schwein.) Sacc. (KRAM-F 55310), C – *Daldinia fissa* C. G. Lloyd (KRAM-F 56616). Scale bar = 10 µm.

NOTES. The number of ridges on ascospores in different collections of *Cainia graminis* vary greatly. I noted six ridges on the ascospores of a specimen from the Tatra Mts and five ridges in material from Tian Shan. Wehmeyer (1975) noted that the ascospores are octagonal, Eriksson (1967) stated that the spores are polygonal, mostly hexagonal, while Parguey-Leduc and Chadefaud (1963) noted five, six or seven ridges on the ascospores. The genus *Cainia* Arx & E. Müll. was included in a separate family, Cainiaceae (Krug 1978), but Kang *et al.* (1999a) stated that based on molecular studies the family Cainiaceae is related to Amphisphaeriaceae (*sensu stricto*) and distantly related to Xylariaceae. As they noted, xylariaceous species have well-developed stromata, whereas in cainiaceous genera the stromata are poorly developed or entirely absent; they included the Cainiaceae in the order Amphisphaeriales. *Cainia graminis* is an arcto-alpine species reported on Cyperaceae and Poaceae (Eriksson 1967; Scheuer 1988; Nograsek 1990). In Poland it was reported on *Festuca tatrae* (Czakó) Degen by Krug (1978), and on *Carex firma* in the Tatra Mts by Scheuer and Chlebicki (1997).

Camarops plana Pouzar Fig. 2

Česká Mykol. **40**(4): 219. 1986.

Stromata large, a few centimeters long, *ca* 3 mm high, black outside, pale brown inside, flat, contour elliptic or egg-shaped, perithecia monostichous, embedded in stroma, deformed by mutual pressure, prismatic, elongated, with long neck and small umbilicate openings (ostioles) similar to small wart. Asci with long pedicel, cylindric, *pars sporifera* 30–36 × 4.5–5.0 µm, ascospores ovoid with blunt ends, blackish, 4.5–5.4 × 2.7–3.0 µm (description after Truszkowska 1965).

The Polish specimen was found in Białowieża National Park, in *Tilio-Carpinetum* on a trunk of *Carpinus betulus* lying in a ditch (August 1961, *leg. W. Truszkowska*).

NOTES. *Camarops plana* was described on the basis of specimens collected on *Carpinus betulus* in Slovakia (Pouzar 1986b). Truszkowska (1965) reported *Camarops tubulina* (Alb. & Schwein.) Shear on a trunk of *Carpinus betulus* from Białowieża National Park in Poland. Dr. Pouzar (pers. comm.) was of the opinion that the specimen reported by Truszkowska (1965) rather belongs to *Camarops plana*. According to the description of this specimen, its surface is flat and the ascospores are smaller than in true *C. tubulina*. There are some other differences; for example, the perithecia of the specimen from Białowieża are distinctly monostichous, as illustrated by Truszkowska (1965; see also her Fig. 2 reproduced here), while Pouzar (1986b) noted that the perithecia of *C. plana* are strongly polystichous. However, in some recent Czech collections monostichous perithecia were also found (Pouzar, pers. comm.) The specimen from Białowieża is not available for study.

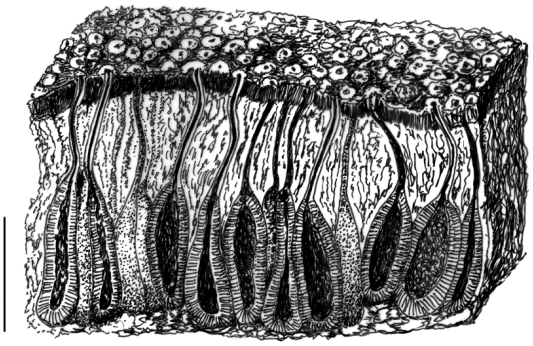

Fig. 2. Section of stroma of *Camarops plana* Pouzar (reproduced from Truszkowska 1965). Scale bar = 1 mm.

Camarops tubulina (Alb. & Schwein.) Shear

Mycologia **30**: 585. 1938.

Stromata pulvinate, 1–3 mm high, ectostroma 40–90 µm thick, black, endostroma pale brown, surface of ectostroma pale reddish-brown when mature, dark brown to black when old, with dotted surface, perithecia monostichous to polystichous, subglobose to ovoid and upwards gradually attenuated into neck, 800–1300 µm high and up to 800 µm wide, ostioles umbilicate, 60–160 µm in diameter. Asci cylindrical to clavate, *pars sporifera* 30–36 × 4.8–5.8 µm, IKI (-), paraphyses filiform, 1 µm wide, septate, ascospores brown, with two drops inside, ellipsoid to ovoid with indistinctly visible germ pore at pointed end, 5–6 × 2.5–3.5 µm.

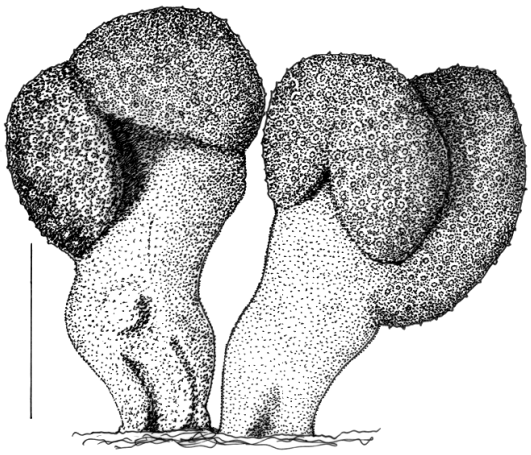

Fig. 3. Stromata of *Daldinia fissa* C. G. Lloyd. (KRAM F-43103). Scale bar = 10 mm.

SPECIMENS EXAMINED. POLAND. Białowieża National Park, section 400, on dead trunk of *Picea abies* (L.) H. Karst., 30 Aug. 1973, *leg. V. Holubová-Jechová* (PRM 852300); Białowieża National Park, section 399, on dead trunk of *Picea abies*, 26 Aug. 1973, *leg. Z. Pouzar*, PRM 866553; Białowieża National Park, section 343, on dead trunk of *Picea abies*, 3 Sept. 1973, *leg. Z. Pouzar* (PRM 852312); Białowieża National Park, section 256, on dead trunk of *Picea abies*, 8 Oct. 2003, *leg. A. Chlebicki* (KRAM F-55321); Białowieża National Park, near Głęboki Kąt Reserve, section 415c, on stump of *Picea abies*, 52°42′22″N, 23°38′27″E, 27 May 2006, *leg. M. Piątek, D. Karasiński & A. Ronikier* (KRAM F-55676); Western Carpathians, Gorce National Park, Kopieniec Mt., elev. *ca* 1000 m a.s.l., on dead, decorticated trunk of *Picea abies* lying in mixed forest with *Fagus sylvatica*, *Abies alba* Mill. and *Picea abies*, 30 Oct. 2005, *leg. A. Chlebicki* (KRAM F-55347); Western Carpathians, Beskid Sądecki Mts, Uhryń Reserve, on stump of *Abies alba*, 30 Apr. 2006, *leg. M. Piątek* (KRAM F-55677). Western Carpathians, Beskid Niski Mts, Modrzyna Reserve, on dead log of *Abies alba*, 6 July 2002, *leg. D. Karasiński* (KRAM F-56618). Eastern Carpathians, Bieszczady Zachodnie Mts, Dolina Hylatego valley, on dead log of *Abies alba*, 7 May 2003, *leg. D. Karasiński* (KRAM F-56617). Pojezierze Kaszubskie lakeland, on bank of Raduńskie Górne Lake, on trunk of *Alnus* sp. and *Picea abies*, 8–17 Apr. 2008, *leg. D. Karasiński* (KRAM F-46644, 46643).

NOTES. The species was originally described as *Sphaeria tubulina* by Albertini and Schweinitz (1805) from Lusatia superior (Oberlausitz) in Silesia (at present it is the area bordering Germany, Poland and the Czech Republic) on *Picea abies* (Nannfeldt 1972). It occurs only on *Picea abies*, *Abies alba* and rarely on *Fagus sylvatica* (Holec 2005). Schröter (1908) reported the next locality in Lower Silesia in the environs of Czerwieńsk (Rothenburg) and Niemodlin (Falkenberg) on *Abies alba*. Zdenek Pouzar found its third Polish locality in Starożyn Reserve on *Picea abies*, collection No. PRM 815140 (Chlebicki & Bujakiewicz 1994; Holec 2005). There are further localities of this species from Poland, recorded by Vera Holubová-Jechová, Zdenek Pouzar, Dariusz Karasiński, Marcin Piatek and me, among them the first records from the Polish Carpathians. The finding reported by Truszkowska (in Domański *et al*. 1970) belongs, according to Nannfeldt (1972), to another species, *Camarops polysperma* (Mont.) J. H. Mill. The *C. tubulina* specimen from the Carpathians (KRAM F-55347) possesses monostichous perithecia and small stromata up to 1.3 mm high. The specimens from Białowieża National Park are larger and have polystichous perithecia.

Daldinia fissa C. G. Lloyd Figs 1C & 3

Mycol. Writ. **7**: 1313. 1922.

Stromata turbinate, brown when young, later black, solitary or aggregated, distinctly stipitate, smooth, 1–1.7 cm in diameter, 0.8–1.4 cm high, surface varnished with age, the tissue below perithecia composed of alternating zones, the lighter zones white and gelatinous. Asci not observed, ascospores dark brown, with broadly rounded ends, 10.5–12(–13) × 6.4–7.3 μm.

SPECIMENS EXAMINED. POLAND. Lower Silesia, Wzgórza Strzelińskie hills, 1 km NE of Biały Kościół town, on burned trunk of broadleaved tree (probably *Prunus spinosa* L.), 26 Mar. 1985, *leg. A. Chlebicki* (KRAM F-55346); Dolina Biebrzy valley (Biebrza National Park), Ciszewo, Brzeziny Ciszewskie forest, in birch forest with *Betula pubescens* Ehrh. on dead, burned branches of *Frangula alnus* Mill., 17 Aug. 1991, *leg. A. Chlebicki* (KRAM F-43103). Małopolska region, Tarnów near Las Lipie forest, on dead trunks of *Betula pendula*, 31 June 1997, *leg. M. Piątek* (KRAM F-56616).

NOTES. The species differs from *Daldinia concentrica* (Bolton) Ces. & De Not. by having stipitate stromata and mycelium below the perithecia, with lighter zones. These alternating zones are initially gelatinous and probably hold water. So far *Daldinia fissa* has not been recorded from Poland. In both localities it occurred on burned, fire-damaged trees. The species is known mostly from the Northern Hemisphere, North America and Eurasia. So far it has been noted on *Betula*, *Carpinus*, *Corylus*, *Fagus*, *Platanus* and *Quercus* (Stadler *et al*. 2001).

Rosellinia corticium (Schwein.) Sacc. Fig. 1B

Syll. Fung. **1**: 253. 1882.

Anamorph: *Geniculosporium* Chesters & Greenh.

Subiculum surrounding stromata, densely woolly, composed of a mycelial mat with brown hyphae with a reddish tinge. Conidiophores present in young subiculum as light brown areas, conidia ellipsoid, hyaline to light brown 7–9 × 4–5 µm. Mature stromata dark brown, 1–1.4 mm in diameter, 1.0–1.2 mm high, semiglobose with flattened top and slightly marked black ostioles, base embedded in subiculum. Asci cylindric, 137–160 × 9–11 µm, ascospores 22–26 × 9–10 µm, dark brown, ellipsoidal to ovoid, straight germ slit nearly the length of the spore, with broadly rounded appendage(s) at one or both ends, the whole spore surrounded by a slimy sheath *ca* 1 µm thick.

SPECIMENS EXAMINED. POLAND. Puszcza Augustowska forest, Sosnowo island in Serwy lake, 23°12′N, 53°54′E, on dead twigs of *Corylus avellana* L., 10 Oct. 2003, *leg. A. Chlebicki* (KRAM F-55310); Białowieża National Park, section 256, *Tilio-Carpinetum*, on dead twig of *Carpinus betulus*, 12 Oct. 1990, *leg. A. Chlebicki* (KRAM F 41470); Małopolska Province, Puszcza Niepołomicka forest, near Wola Batorska on dead twigs of *Corylus avellana*, 3 April 2007, *leg. A. Chlebicki* (KRAM F-56254).

NOTES. It is one of the most common species of *Rosellinia* De Not. in Europe, but was not reported by any European mycologist until Petrini (1993) noted it. Many collections identified as *Rosellinia aquila* (Fr.) De Not. [= *R. byssiseda* (Tode) Schroeter] are not this fungus. It is possible that *R. corticium* was earlier included in *R. aquila* (Petrini 1993).

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APPENDIX

LIST OF XYLARIACEOUS FUNGI FROM POLAND

The presented classification is based on Rappaz (1987), Eriksson (2006), *Index Fungorum* (Kirk 2007) and Acero *et al.* (2004). Species in bold are new to Poland. Names of genera in parenthesis are questioned and subject to change.

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Incertae sedis

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