

Dactylospora anziae, a new lichenicolous ascomycete on *Anzia* from East Asia

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Abstract: *Dactylospora anziae* growing on species of *Anzia* is described from Russia and Japan.

Keywords: new species; Russia; Japan

INTRODUCTION

Dactylospora Korb. (Dactylosporaceae) is a genus of discomycetes comprising about 50 species, mostly growing on lichens but also occurring on non-lichenized fungi, bryophytes, bark or lignum (Hafellner, 2004). Lichenicolous species of *Dactylospora* are known from a wide range of distantly related lichens, but have not been yet reported from *Anzia* (Lawrey & Diederich, 2017). Previously, the latter genus was known to host just one species of lichenicolous fungi, *Skyttea anziae* Etayo & Diederich, reported on *Anzia* sp. from Columbia (Etayo, 2002). The aim of this paper is to describe a new *Dactylospora* species found on several species of *Anzia* in Asian-Pacific region.

MATERIAL AND METHODS

The specimens were examined using Zeiss microscopes Stemi 2000-CS and Axio Imager A1 equipped with Nomarski differential interference contrast optics. Microscopical examination was done in water, 10% KOH (K), Lugol's iodine directly (I) or after a KOH pre-treatment (K/I). Measurements were taken from water mounts and are indicated as (minimum)–{X–SD}–{X+SD} (–maximum), where X is the arithmetic mean and SD the corresponding standard deviation, followed by the number of measurements. The length/breadth ratio of ascospores is indicated as l/b and given in the same way. Examined

specimens are deposited in the herbaria LE, TNS, and in the herbarium of Pacific Institute of Geography in Vladivostok [designated below as PIG; this acronym is not yet included in Index Herbariorum (Thiers, 2017)].

DACTYLOSPORA ANZIAE Zhurb., Ezhkin, Skirina & Y. Ohmura sp. nov. (Fig. 1)

Mycobank No.: MB 821514

Lichenicolous fungus. Morphologically similar to *Dactylospora rimulicola*, but distinguished mainly by the reddish brown vs. brown epiphymenium, exciple and hypothecium, paraphyses without dark apical cap, finely verruculose vs. smooth ascospores, and a different host genus, *Anzia* vs. *Lecanora* and possibly *Pertusaria*.

Type: Russia, Sakhalin Region, Kuril Islands, Kunashir Is., near Tret'yakovo, 43°58'28.8"N, 145°39'33.2"E, elev. 110 m, old growth coniferous-deciduous forest, on *Anzia colpota* (thallus) growing on bark of *Phellodendron sakhalinense*, 20.06.2014, A. K. Ezhkin (LE 309623 – holotype).

Etymology – The epithet refers to the host lichen genus *Anzia*.

Description – *Apothecia* uniformly blackish, (100–)150–400(–600) µm diam. (n = 35), with more or less plane disc, usually with distinct

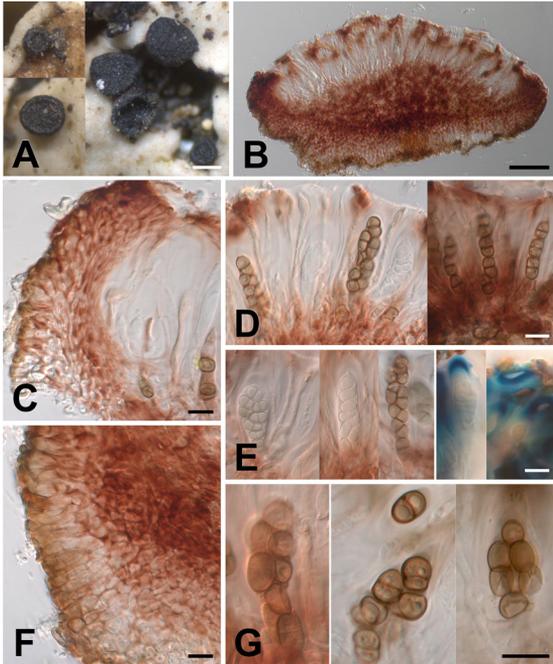


Fig. 1. *Dactylospora anziae*. A – apothecia (left, LE 309624; right, holotype); B – apothecium in cross section in water (LE 309624); note brown outer rim; C – upper part of lateral exciple in cross section in water (LE 309624); D – epiphymenium, hymenium, paraphyses and asci with spores in water (LE 309624); E – asci in water (left, holotype) and I (right, holotype); F – lower part of lateral exciple in cross section in water (LE 309624); G – ascospores in water (holotype, left) and in K (LE 309624, right); note thin verruculose wall. Scale bars: A = 200 µm; B = 50 µm, C–G = 10 µm.

margin, sessile, constricted at the base, dispersed to aggregated. *Lateral exciple* 30–50 µm thick, medium to pale (at the underside of apothecia) reddish brown, K+ brown to greyish brown, with brown, K– outer rim; composed of thick-walled, isodiametric or radially elongated (in the marginal parts) cells. *Lower exciple* (hypothecium) 80–170 µm tall, medium reddish brown, composed of thick-walled, isodiametric cells. *Epiphymenium* medium reddish brown (pigmentation patchy, amorphous), 5–8 µm tall, K+ brown to greyish brown. *Hymenium* hyaline or occasionally partly pale reddish brown, 50–60(–70) µm tall, I and K/I+ blue or partly red. *Pa-*

raphyses occasionally branched above, septate, constricted at the septa, 1–2.5(–3.5) µm diam.; apex enlarged, but not capitate, 3–4.5 µm diam., without distinct dark cap. Apothecial sections without blue-green, K+ aeruginose patches. Asci clavate to broadly cylindrical, (42–)44–56(–60) × (10–)11–15(–17) µm (n = 15), 8-spored, covered by a I and K/I+ blue or partly red gelatinous layer (staining more intense blue at the top). *Ascospores* oblong, ellipsoid or obovoid, with rounded ends, (6.3–)8.9–10.4(–12.3) × (3.8–)4.8–6.2(–7.9) µm, 1/b = (1.1–)1.5–1.9(–2.4) (n = 222), (0–)1-septate, usually constricted at the septum (sometimes markedly so), initially hyaline, later light olive grey and finally light to medium brown, with finely verruculose wall 0.4–0.7 µm thick, usually with conspicuous guttules (better seen in K), biseriate to diagonally uniseriate in the ascus. *Conidiomata* not observed.

Distribution and hosts – The new species is known from 17 collections in the Far East of Russia (Jewish Autonomous Region, Khabarovsk Territory, Primorye Territory and Sakhalin Region) and Japan (Hokkaido), growing in coniferous, deciduous or mixed forests on thalli and occasionally apothecia of *Anzia colpodes*, *A. colpota*, *A. opuntiella* and *A. stenophylla*. Pathogenicity not observed.

Notes – Twenty seven of 40 (68%) currently known lichenicolous species of *Dactylospora* are confined to particular host genus, none of them was known to grow on *Anzia*, Parmeliaceae (Lawrey & Diederich, 2017). The species of *Dactylospora* growing on the other members of Parmeliaceae clearly differ from *D. anziae* in the following way: *D. allantoidea* Alstrup & *D. Hawksw.* (reported on *Xanthoparmelia pulla*) has much larger allantoid ascospores 24.5–28 µm long (Alstrup & Hawksworth, 1990); *D. inconspicua* Etayo (on *Menegazzia* spp.) and *D. polyspora* Triebel (on *Protoparmelia* spp.) are characterized by polyspored asci (Etayo & Sancho, 2008; Triebel, 1989).

The other lichenicolous species of *Dactylospora* with 8-spored asci and 1-septate ascospores of similar size differ from *D. anziae* as follows: *D. acarosporae* (H. Magn.) Hafellner (reported on *Acarospora* spp.) is distinguished from the new species by its brown epiphymenium and exciple, paraphyses with dark apical caps and narrower ascospores, 8–11 × 3.5–5 µm (Hafellner, 1979); *D. aeruginosa* Hohlén & Ihlen (on

various crustose lichens, also on bark and wood) clearly differs by the presence of violet-blue, K⁺ aeruginose patches in apothecial sections (Ihlen et al., 2004); *D. amygdalariae* Triebel (on *Amygdalaria* spp.) has a brown epihymenium and exciple, paraphyses with dark apical caps and narrower ascospores, 7–12 × 3.5–5.5 μm (Triebel, 1989); *D. athallina* (Müll. Arg.) Hafellner (on *Baeomyces rufus*) is distinct by its K⁺ purple epihymenium and somewhat longer ascospores, 9–14.5 × 4–7 μm (Hafellner, 1979); *D. australis* Triebel & Hertel (on species of *Lecidea*, *Parapropidia*, *Poeltiaria*, *Poeltidea*, *Porpidia*, *Rimularia* and *Tremolecia*) has a brown epihymenium and exciple, paraphyses with dark apical cap and somewhat longer and narrower ascospores, 7.5–13.5 × 4–6 μm (Triebel, 1989); *D. homoclinella* (Nyl.) Hafellner (on species of *Lecanora* and *Tephromela*) has a brown epihymenium and exciple, paraphyses with dark apical caps and somewhat longer and narrower ascospores, 7.5–12 × 4–6 μm (Hafellner, 1979); *D. protothallina* (Anzi) Hafellner (on species of *Fuscopannaria* and *Parmeliella*) is distinct by a brown epihymenium and exciple and longer ascospores, 9–15 × 4.5–7.5 μm (Hafellner, 1979); *D. rimulicola* (Müll. Arg.) Hafellner (on species of *Lecanora* and possibly *Pertusaria*) differs in having a brown epihymenium, exciple and hypothecium, hyaline hymenium, paraphyses with dark apical caps and smooth ascospores (Hafellner, 1979); *D. saxatilis* (Schaer.) Hafellner (on species of *Ochrolechia* and *Pertusaria*) can be distinguished by the initially immersed apothecia, brown epihymenium and exciple, paraphyses with dark apical caps and longer ascospores, 9–15 × 4.5–7.5 μm (Hafellner, 1979); *D. tegularum* (Arnold) Hafellner (on *Caloplaca* spp.) differs in having for the most part immersed apothecia, a brown epihymenium and exciple and paraphyses with dark apical caps (Hafellner, 1979).

Additional specimens examined: RUSSIA. Jewish Autonomous Region: Malyi Khingan Range, Bastak Reserve, Mt. Chernukha, 49°05'59"N, 133°03'14"E, elev. 590 m, coniferous-deciduous forest, on *Anzia colpodes* (thallus), 12.08.2002, I. F. Skirina (LE 309628, FIG 24614); Bastak Reserve, km 36 of road from Birobidzhan to Kukan, 49°03'14"N, 133°02'50"E, elev. 590 m, coniferous-deciduous forest, on *A. colpodes* (thallus), 13.08.2002, I. F. Skirina & V. I. Skirin (LE 309629, FIG 14510). **Khabarovsk Territory:** Sikhote-Alin' Range, near Mukhen, Si River, head-

waters of Signal'nyi Creek, 48°11'20"N, 136°11'22"E, elev. 100 m, coniferous-deciduous forest, on *A. stenophylla* (thallus), 17.07.1983, I. F. Skirina (LE 309630, FIG 20356); same place, on *A. opuntiella* (thallus), 17.07.1983, I. F. Skirina (LE 309631, FIG 5871). **Primorye Territory:** Chernye Mts., Mt. Shapka near Nezhino, 43°25'55"N, 131°43'09"E, elev. 190 m, oak forest, on *A. stenophylla* (thallus), 26.06.2009, I. F. Skirina & F. V. Skirin (LE 309632, FIG 25562); Chernye Mts., Kedrovaya Pad' Reserve, southeastern slope of Gakkelevskiy Ridge, 43°06'02"N, 131°34'06"E, elev. 300 m, oak forest, on *A. colpodes* (thallus), 6.10.1954, L. N. Vasil'eva (LE 309633, FIG 13209); same place, on *A. colpodes* (thallus), 10.07.1999, I. F. Skirina (LE 309634, FIG 34749); Chernye Mts., Kedrovaya Pad' Reserve, Sukhorechenskiy Ridge, 43°05'47"N, 131°25'22"E, elev. 650 m, black fir-spruce forest, on *A. colpodes* (thallus), 11.07.1999, I. F. Skirina (LE 309635, FIG 34616); Sikhote-Alin' Range, Partizanskiy Ridge, Mt. Lysaya near Binevskoe, headwaters of Elamovskiy Creek, 43°14'46"N, 133°42'57"E, elev. 750 m, fir-spruce forest, on *A. colpodes* (thallus), 29.08.2001, I. F. Skirina (LE 309636, FIG 30394); Sikhote-Alin' Range, near Valentin, Valentinovka Creek, 43°08'09"N, 134°16'26"E, elev. 95 m, deciduous forest, on *A. stenophylla*, 24.08.2008, A. V. Dudnik (LE 309637, FIG 24278); Sikhote-Alin' Range, Ussuriyskiy Reserve, Anikina pad' River, 43°40'52"N, 132°29'08"E, elev. 200 m, spruce forest, on *A. stenophylla* (thallus), 7.06.1974, L. A. Knyazheva (LE 309638, FIG 9772); Ussuriyskiy Reserve, Mironov Creek, 43°39'04"N, 132°27'09"E, elev. 260 m, pine-deciduous forest, on *A. colpodes* (discs of apothecia, thallus), 14.08.1958, N. I. Vokueva (LE 309639, FIG 9760); **Sakhalin Region:** same place as for the holotype, on *A. colpota* (discs and margins of apothecia, thallus), 20.06.2014, A. K. Ezhkin (LE 309624); Kuril Islands, Kunashir Is., Prosolovskie springs, 44°19'58.43"N, 146°1'14.52"E, elev. 15 m, old growth coniferous-deciduous forest, on *A. colpota* (thallus), 19.06.2014, A. K. Ezhkin (LE 309625). **JAPAN. Hokkaido:** Prov. Kushiro, Aikappu, Akkeshi-gun, 43°01'N, 144°50'E, elev. 70 m, deciduous forest dominated by *Quercus crispula*, *Acer mono*, and *Tilia japonica*, on *A. colpota* (thallus), 8.08.2002, T. Shiba 333 (TNS); Prov. Kushiro, Mt. O-Akan, 43°26'N, 144°08'E, elev. 460 m, mixed forest dominated by *Abies sachalinensis*, *Picea jezoensis*, *Magnolia obovata* and *Quercus crispula*, on *A. colpota* (thallus), 29.08.1965, S. Kurokawa 65634 (TNS).

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