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SURVEY OF THE GENUS *DISCOSIA* (ANAMORPHIC FUNGI) IN POLAND

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Abstract: Until recently only two species of the genus *Discosia* Libert, *D. artocreas* (Tode: Fr.) Fr. and *D. strobilina* Libert, have been known from Poland, but lately another three species were collected, *D. lysimachiae* Vanev, *D. minuta* Ces. and *D. vincae* Vanev, new for Poland and rarely reported in the world. Of all fungi reported in this work the most common is *Discosia artocreas*, hitherto found in Poland on 12 host plants. Currently this fungus is reported from a further eight hosts: *Anemone nemorosa* L., *Galium odoratum* (L.) Scop., *Gymnocarpium dryopteris* (L.) Newman, *Moehringia trinervia* (L.) Clairv., *Mycelis muralis* (L.) Dumort., *Oxalis acetosella* L., *Tilia cordata* Mill. and *Viola reichenbachiana* Jord. ex Boreau. This paper provides full documentation of collected species of *Discosia* together with the distribution in Poland of all species belonging to this genus. Yet another one species reported from Poland under generic name *Discosia*, viz. *Discosia alnea* (Pers.) Berk. is now considered to be member of the genus *Asteroma* DC. – *Asteroma alneum* (Pers.: Fr.) B. Sutton.

Key words: anamorphic fungi, coelomycetes, *Discosia*, *Asteroma*, distribution in Poland

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INTRODUCTION

Fungi belonging to the genus *Discosia* Libert (coelomycetes, anamorphic fungi) are saprobes or parasites of vascular plants, known from many localities distributed throughout the world. Their taxonomy has been studied by Subramanian and Chandra-Reddy (1974), Sutton (1980) and others. Vanev (1991, 1992a, b, c, d) made a detailed taxonomic revision. On the basis of the location of the conidial septa and appendages he delimited six sections (Vanev 1991), and to clarify the status of the genus he designated its lectotype, *Discosia artocreas* (Tode: Fr.) Fr. (Vanev 1992a).

In a world monograph of the anamorphic fungi that form appendages, Nag Raj (1993) mentioned 70 species of *Discosia*. However, in recent years many new species have been described (Vanev 1993, 1998; Vanev *et al.* 1997), so the number of known species is surely larger.

All fungi collected at present (*Discosia artocreas*, *D. lysimachiae* Vanev, *D. minuta* Ces. and *D. vincae* Vanev) belong to section *Discosia*. This section comprises species that form 3-septate conidia (4-celled). The middle cell adjacent to the base is always longer than the middle cell adjacent to the apex. The appendages arise next to the apex and base of the conidium (Vanev 1991; Vanev *et al.* 1997).

In Poland, two other species of the genus *Discosia* were known: *D. alnea* (Pers.) Berk. and *D. strobilina* Libert. *Discosia strobilina* belongs to section *Strobilina* Vanev, which differs from section *Discosia* in that the appendages arise next to the end septa. The distribution in Poland of this species is documented only by literature data. *Discosia alnea* is now excluded from the genus *Discosia* and its current name is *Asteroma alnea* (Pers.: Fr.) B. Sutton (for discussion see below).

The collection is housed in LBLM, and some duplicates are preserved in KRAM. Nomenclature of the fungi is based on recent monographs and publications, including Morochovski *et al.* (1971), Nag Raj (1993) and Vanev *et al.* (1997), and the names of the host plants according to Mirek *et al.* (2002). The division of Poland into physical-geographical units follows Kondracki (1998).

ENUMERATION OF SPECIES

Discosia artocreas (Tode: Fr.) Fr. (Fig. 1)

Summa veg. Scand. **2**: 423. 1849.

Pycnidia 80–170 µm diam., circular, disc-shaped or plane, sometimes immersed in the leaves, black, shiny, single, scattered or gregarious. Ostioles 20–45 µm diam., central or eccentric. Conidia 4-celled, cylindrical, slightly narrowed at the ends, rounded at the apex, truncate at the base, slightly curved or straight, hyaline, 15.5–17.5 × 2.5 µm. Appendages filiform, unbranched, hyaline, straight, up to 10 µm long.

SPECIMENS EXAMINED. POLAND. On *Acer platanoides* L.: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża National Park, Forest Compartment 342, Permanent plot No. 40 BSG UW, 17 June 1995, *leg. W. Mułenko* (LBLM 8425); on *Anemone nemorosa* L.: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża National Park, Forest Compartment 342, Permanent plot No. 40 BSG UW, 17 June 1995, *leg. W. Mułenko* (LBLM 8426); on *Galium odoratum* (L.) Scop.: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża National Park Forest Compartment 342, Permanent plot No. 40 BSG UW, 28 Sept. 1992, *leg. W. Mułenko* (LBLM 8429); on *Gymnocarpium dryopteris* (L.) Newman: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża National Park, Forest Compartment 342, Permanent plot No. 40 BSG UW, 18 June 1995, *leg. W. Mułenko* (LBLM 8427); on *Moehringia trinervia* (L.) Clairv.: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża National Park, Forest Compartment 342, Permanent plot No. 40 BSG UW, 29 Sept. 1992, *leg. W. Mułenko* (LBLM 8431), 20 Aug. 2002, *leg. M. Kozłowska* (LBLM 8428); on *Mycelis muralis* (L.) Dumort.: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża National Park, Forest Compartment 342, Permanent plot No. 40 BSG UW, 3 Sept. 1994, *leg. W. Mułenko* (LBLM 8423), 8 Sept. 2003, *leg. M. Kozłowska* (LBLM 8424); on *Oxalis acetosella* L.: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża National Park, Forest Compartment 342, Permanent plot No 40 BSG UW, 18 Aug. 1992, *leg. W. Mułenko* (LBLM 8449), 6 Sept. 1994, *leg. W. Mułenko* (LBLM 8453), 26 Sept. 1992, *leg. W. Mułenko* (LBLM 8452), 29 Sept. 1992, *leg. W. Mułenko* (LBLM 8450), 8 Sept. 2003, *leg. M. Kozłowska* (LBLM 8451); on *Tilia cordata* Mill.: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża National Park, Forest Compartment 342, Permanent plot No 40 BSG UW, 27 Oct. 1992, *leg. W. Mułenko* (LBLM 8458); on *Viola reichenbachiana* Jord. ex Boreau: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża National Park, Forest Compartment 342, Permanent plot No 40 BSG UW, 18 Aug. 1992, *leg. W. Mułenko* (LBLM 8454), 2 Sept. 1994, *leg. W. Mułenko* (LBLM 8433, 8435, 8436), 4 Sept. 2003, *leg. M. Kozłowska* (LBLM 8447), 5 Sept. 1994, *leg. W. Mułenko* (LBLM 8441), 6 Sept. 1994, *leg. W. Mułenko* (LBLM 8444), 7 Sept. 1994, *leg. W. Mułenko* (LBLM 8445, 8446, 8448), 26 Sept. 2002, *leg. M. Kozłowska* (LBLM 8443), 27 Sept. 1992, *leg. W. Mułenko* (LBLM 8442, 8439, 8440), 28 Sept. 1992, *leg. W. Mułenko* (LBLM 8437, 8438), 29 Sept. 1992, *leg. W. Mułenko* (LBLM 8432, 8434).

LITERATURE RECORDS. POLAND. On *Acer platanoides* L.: POJEZIERZE WIELKOPOLSKIE LAKELAND: Ludwikowo near Poznań; PRADOLINA TORUŃSKO-EBERSWALDZKA SPILLWAY: Włocławek (Dominik 1936); on *Betula pendula* Roth: NIZINA ŚRODKOWOMAZOWIECKA LOWLAND: Dębina Reserve near Warsaw (Borowska 1966); on *Carpinus betulus* L.: NIZINA ŚRODKOWOMAZOWIECKA LOWLAND: Dębina Reserve near Warsaw (Borowska 1966); on *Chamaedaphne calyculata* (L.) Moench: POJEZIERZE MAZURSKIE LAKELAND: Grom near Szczytno, Sołtysek Reserve (Chlebicki 2002); on *Chenopodium bonus-henricus* L.: TATRA MTS: Tatra National Park, Dolina Kościeliska valley (Starmachowa 1963); on *Corylus avellana* L.: NIZINA ŚRODKOWOMAZOWIECKA LOWLAND: Dębina Reserve near Warsaw

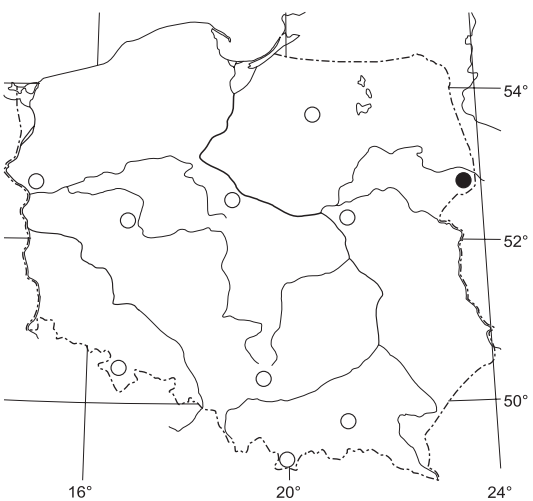

Fig. 1. Distribution of *Discosia artocreas* (Tode: Fr.) Fr. in Poland. ○ – localities known from literature, ● – sampling sites.

(Borowska 1966); on *Fagus* sp.: WYŻYNA KRAKOWSKO-CZĘSTOCHOWSKA UPLAND: Rabsztyn near Olkusz (Gumińska 1962); on *Populus tremula* L.: NIZINA ŚRODKOWOMAZOWIECKA LOWLAND: Dębina Reserve near Warsaw (Borowska 1966); on *Quercus coccinea* Muenchh.: PRADOLINA TORUŃSKO-EBERSWALDZKA SPILLWAY: Dąbroszyn II near Kostrzyn (Diedicke 1915); on *Quercus robur* L.: WESTERN CARPATHIANS: Zagórzany near Gorlice (Namysłowski 1909, 1914); NIZINA ŚRODKOWOMAZOWIECKA LOWLAND: Dębina Reserve near Warsaw (Borowska 1966); on *Sorbus aucuparia* L. *em*. Hedl.: SUDETES: Kudowa Zdrój (Starmachowa & Kućmierz 1967); on *Sorbus domestica* L.: PRADOLINA TORUŃSKO-EBERSWALDZKA SPILLWAY: Dąbroszyn II near Kostrzyn (Diedicke 1915).

NOTES. According to Vanev *et al.* (1997), the dimensions of pycnidia of this species vary greatly, ranging between 80 and 350 μm. The conidia (16.3–20.0 × 1.8–2.5 μm) are also larger than in our specimens. *Discosia artocreas* is a cosmopolitan saprobe occurring on dead remnants (mainly leaves) of various host plants belonging to 20 genera and 15 families (Diedicke 1915; Starmachowa 1963; Starmachowa & Kućmierz 1967; Borowska 1966; Vanev *et al.* 1997; Chlebicki 2002). *Anemone nemorosa*, *Galium odoratum*, *Gymnocarpium dryopteris*, *Moehringia trinervia*, *Mycelis muralis*, *Oxalis acetosella, Tilia cordata* and *Viola reichenbachiana* are new host plants for *Discosia artocreas*. In consequence, the number of host genera is now increased to 28, while the number of host families is increased to 21.

GENERAL DISTRIBUTION. The fungus is known from Europe, Asia and North America (Vanev *et al.* 1997).

Discosia lysimachiae Vanev (Figs 2 & 3)

in Vanev, Sameva & Bakalova, Fungi Bulgaricae **3**(1), Addenda: 323. 1997.

Leaf spots rounded or irregular, 3–7 mm diam., light brownish, usually with thin, darker margin. Pycnidia clearly visible on the upper side of leaves, black, shiny, 114–160 μm diam. Ostioles rather large, 16–24 μm diam. Conidia 4-celled, (12–)14–16 × 2–3 μm, two marginal cells hyaline, two middle cells darker, yellow-greenish. Appendages unbranched, up to 10 μm long.

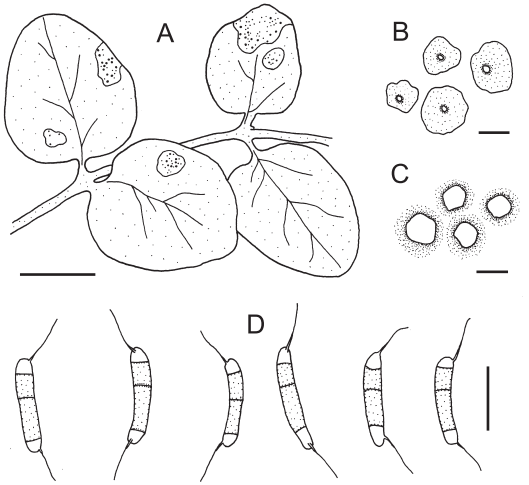

Fig. 2. *Discosia lysimachiae* Vanev on *Lysimachia nummularia* L. A – leaves (scale bar = 10 mm), B – pycnidia (scale bar = 100 μm), C – ostiole (scale bar = 20 μm), D – conidia (scale bar = 10 μm).

SPECIMENS EXAMINED. POLAND. On *Lysimachia nummularia* L.: WESTERN CARPATHIANS: Łęki Górne, *ca* 16 km SE from center of Tarnów, ex manor park, 11 Aug. 1998, *leg. M. Piątek* (LBLM 8420, KRAM-F 53498), KOTLINA SANDOMIERSKA BASIN: Tarnów, Park Sanguszków (at Gumniska St.), ex manor park, 8 Aug. 1998, *leg. M. Piątek* (LBLM 8419, KRAM-F 53499);

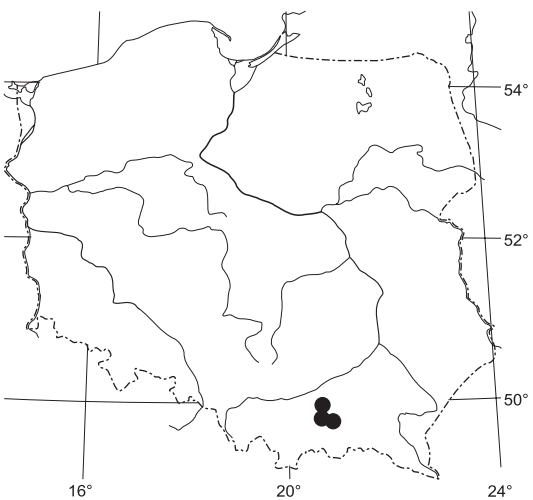

Fig. 3. Distribution of *Discosia lysimachiae* Vanev in Poland. ● – sampling sites.

Dąbrowa Tarnowska, city park, 14 Aug 1998, *leg. M. Piątek* (LBLM 8422, KRAM-F 53500).

NOTES. According to Vanev *et al.* (1997), the conidia of *Discosia lysimachiae* are slightly longer and wider (13.8–18.8 × 3.0–3.5 μm) than in our specimens.

GENERAL DISTRIBUTION. Europe and North America (Vanev *et al.* 1997). This is a new species for Poland.

Discosia minuta Ces. (Figs 4 & 5)

in Klotzsch., Herb. Viv. Mycol.: No 1961, 1852.

Pycnidia 120–170 μm diam., rounded or irregular, disc-shaped or almost plane, black, shiny, single or gregarious, usually on upper side of leaf. Ostioles 17–30 μm diam., central or eccentric. Conidia 4-celled, cylindrical, slightly narrowed at the ends, rounded at the apex, truncate at the base, straight or slightly curved, hyaline, (12.5–)15.0–17.5 × 2.5 μm. Appendages filiform, hyaline, straight or slightly curved, up to 10 μm long.

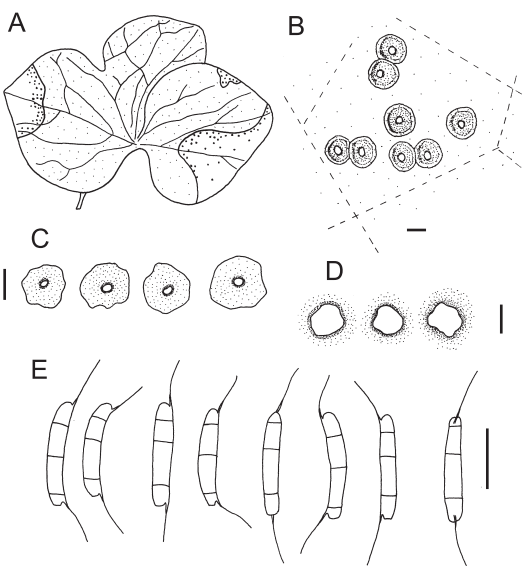

Fig. 4. *Discosia minuta* Ces. on *Hepatica nobilis* Schreb. A – leaf (natural size), B – fragment of leaf surface with pycnidia, C – pycnidia (scale bar = 100 μm), D – ostiole (scale bar = 20 μm), E – conidia (scale bar = 10 μm).

SPECIMENS EXAMINED. POLAND. On *Hepatica nobilis* Schreb.: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża National Park, Forest Compartment 342, Permanent plot No. 40 BSG UW, 6 Sept. 1994, *leg. W. Mułenko* (LBLM 8430), 16 Sept. 2002, *leg. M. Kozłowska* (LBLM 8456), 17 Sept. 2002, *leg. M. Kozłowska* (LBLM 8457), 4 Oct. 1994, *leg. W. Mułenko* (LBLM 8455).

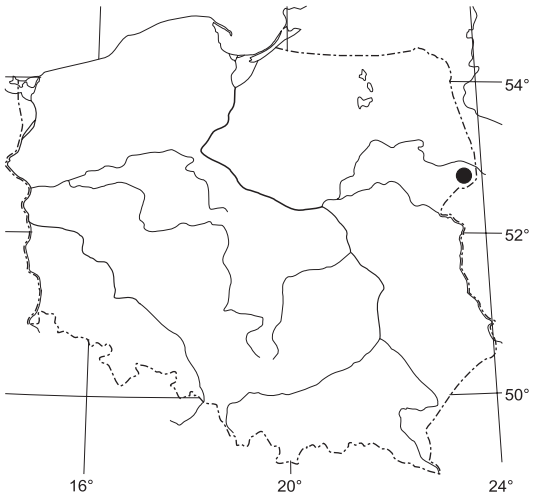

Fig. 5. Distribution of *Discosia minuta* Ces. in Poland. ● – sampling site.

NOTES. According to Vanev *et al.* (1997), the dimensions of the pycnidia the range between 80 and 200 μm, while the conidia are slightly smaller (11.3–15.0 × 2.0–2.5 μm) than in our observation.

GENERAL DISTRIBUTION. *Discosia minuta* is a cosmopolitan saprobe occurring on representatives of 16 genera of host plants belonging to 12 families. It is known from Europe and North America (Vanev *et al.* 1997). This species is new to Poland.

Discosia strobilina Libert (Fig. 6)

Pl. crypt. Ard. exs.: No 346. 1837.

LITERATURE RECORDS. POLAND. On *Dryas octopetala* L.: TATRA MTS: Tatra National Park, Dolina Strążyska valley, Sarnia Skała Mt., between Dolina

Strążyska valley and Dolina Białego valley (Chlebicki 1995, 2002); on *Picea abies* (L.) H. Karst.: NIZINA PÓŁNOCNOPODLASKA LOWLAND: Białowieża Primeval Forest (Siemaszko 1923).

NOTES. Detailed characteristics of this species together with its description and illustration are given by Chlebicki (1995, 2002).

GENERAL DISTRIBUTION. Europe, Asia and North America (Farr *et al.* 2003).

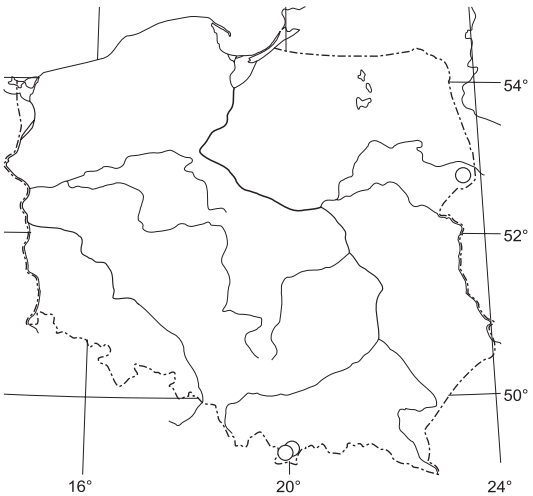

Fig. 6. Distribution of *Discosia strobilina* Libert in Poland. ○ – localities known from literature.

Discosia vincae Vanev (Figs 7 & 8)

in Vanev, Sameva & Bakalova, Fungi Bulgaricae **3**(1), Addenda: 324. 1997.

Spots usually near the margin of the leaves, irregular or ellipsoidal, light brownish with thin darker wrapper, single or merged together, 6–10 × 3–5 mm diam. Pycnidia 140–190 µm diam., clearly visible on the upper leaf side, black, shiny, single or gregarious. Ostioles rather large, 20–34 µm diam. Conidia 4-celled, 12.0–14.0 × 2.0–2.5 µm, two marginal cells hyaline, two middle cells darker, yellow-greenish. Appendages unbranched, up to 10 µm long.

SPECIMEN EXAMINED. POLAND. On *Vinca minor* L.: KOTLINA SANDOMIERSKA BASIN: Łęg Tarnowski, *ca*

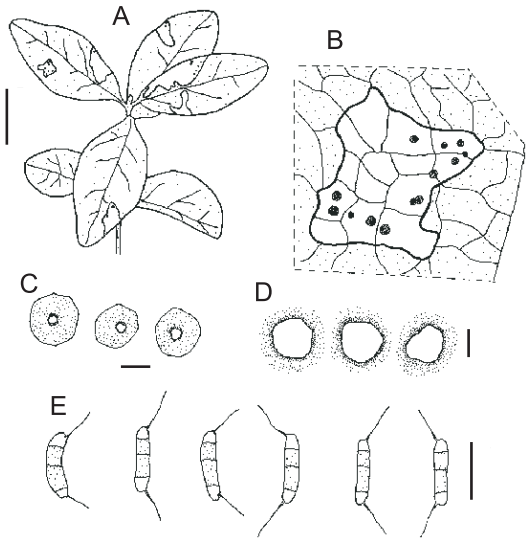

Fig. 7. *Discosia vincae* Vanev on *Vinca minor* L. A – leaves (scale bar = 10 mm), B – fragment of leaf surface with pycnidia, C – pycnidia (scale bar = 10 µm), D – ostiole (scale bar = 20 µm), E – conidia (scale bar = 10 µm).

9 km NW from center of Tarnów, ex manor park, 30 July 1997, *leg. M. Piątek* (LBLM 8421).

NOTES. Vanev *et al.* (1997) gave slightly larger dimensions of the pycnidia (160–220 µm) and conidia (13.8–18.8 × 2.5–3.0 µm).

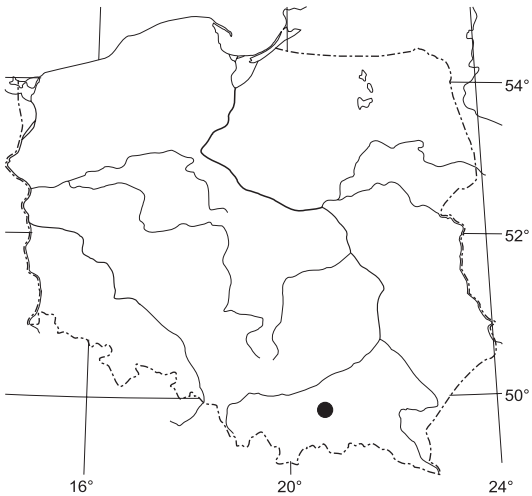

Fig. 8. Distribution of *Discosia vincae* Vanev in Poland. ● – sampling site.

GENERAL DISTRIBUTION. The species was known only from the type locality in Bulgaria (Vanev *et al.* 1997). Now the second world locality is given, making *Discosia vincae* a species new for Poland.

EXCLUDED SPECIES

Discosia alnea (Pers.) Berk., Outl. Br. Fungol.: 318. 1860.

≡ *D. alnea* Pers., ?*D. alnea* Fr.

LITERATURE RECORDS. POLAND. On *Alnus glutinosa* Gaertn.: BRAMA KRAKOWSKA GATE: Kraków and neighboring towns – Czarna Wieś, Zabierzów, Wola Justowska (Namysłowski 1906, 1914); WESTERN CARPATHIANS: surroundings of Grybów (Namysłowski 1910, 1914), Wolica near Nowy Sącz (Namysłowski 1914); POJEZIERZE WIELKOPOLSKIE LAKELAND: Kalwy, Podłoziny, Niepruszewo near Grodzisk (Dominik 1936); POJEZIERZA POŁUDNIOWOBAŁTYCKIE LAKELANDS: Kuczek near Ciechocinek (Rouppert 1909).

NOTES. Dominik (1936) reported from Poland another *Discosia* species, *Discosia alnea* (Pers.) Berk. Probably the same taxon was earlier published by Namysłowski (1906, 1914) and Rouppert (1909), but these authors used an other authority for its name, namely *Discosia alnea* Fr. In the available literature we did not find information on whether this is an appropriate synonym of *Discosia alnea* (Pers.) Berk. (= *D. alnea* Pers.). Unfortunately, these data cannot be verified because no voucher specimens are preserved in KRA and KRAM, where they would be expected to have been deposited. The name *Discosia alneum* (Pers.) Berk. is based on *Xyloma alneum* Pers. Sutton (1980) studied the authentic specimen of *Xyloma alneum* deposited in IMI and established that the fungus has typically acervular conidiomata and 1-celled conidia without appendages. In consequence he transferred the species to the genus *Asteroma* DC., creating the combination *Asteroma alneum* (Pers.: Fr.) B. Sutton. Vanev's revision of the type specimen of *Xyloma alneum* from IMI confirmed this conclusion and decision (anonymous reviewer, pers. comm.). Therefore we also excluded this taxon from our survey of Polish *Discosia*.

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