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Some zygomycetous fungi new to Poland

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In the years 1996–1997 the authors studied soil and coprophilic fungi. During the study the following species of zygomycetous fungi were recorded the first time from Poland: *Absidia parricida, Dimargaris cristalligena, Mortierella gamsii, Mortierella sclerotiella* and *Spinalia radians.* The present data are based on material collected by the authors from many regions of Poland, among others: in Słowiński National Park, Tatrzański National Park, Wielkopolski National Park, Wigierski National Park and Woliński National Park.

Key words: *Absidia, Dimargaris, Mortierella, Spinalia, Zygomycetes.*

INTRODUCTION

Representatives of the orders *Mucorales* and *Dimargaritales* are rarely the subject of taxonomical and biogeographical research. Studies concerning coprophilic and soil fungi were conducted in Poland by Schroeter (1886, 1897), Krzemieniewska and Badura (1954), Badura and Badurowa (1964), Zadara (1977), Skirgiełło and Zadara (1979) and Bebłowska (1991/1992). The knowledge of the occurrence and distribution of these organisms in Poland is still insufficient. Among fungi belonging to the order *Mucorales* which were described after 1978 only *Mortierella multidivaricata* Benjamin (1978) was observed in Poland (Bebłowska 1991/1992). During the years 1996–1997 the authors investigated zygomycetous fungi in soil and on dung of domestic and wild herbivorous animals. Several noteworthy species new to Poland were recorded. The descriptions below include only the features which were observed in the collected material (Fig. 1 and 2).

Absidia parricida Renner et Muscat ex Hesseltine et J. J. Ellis, 1961

Colonies of *Absidia parricida* on *Absidia glauca*, *A. spinosa* and *A. coerulea* ascending on host hyphae, 0.2–0.3 cm high, grey or brownish. Sporophores erect, (21–) 32–200 (–380) μm high, 1.9–4.2 μm wide, arising from the stolon usually 1–3 in the same place, simple as well as monopodially branched. Septum present below apophyses. Sporangia usually (12) 17–40 μm in diameter, globose to piriform, with deliquescent, smooth wall. Columellae 6.4–18.5 μm long, 4.3–18.5 μm wide, hyaline, globose, subglobose to applanate, sometimes with the projection up to 6.3 μm long. Collar often darkish, well-defined. Sporangiospores ovoid to short cylindrical, hyaline, 1.5–4.5 μm long, 1–2.5 μm wide. Zygospores on aerial mycelium, orange, light brown to brown, (25–)51–70 μm in diameter on equal large suspensors 12–23 μm in diameter. Zygospores are not enveloped in appendages arising from suspensors. Chlamydospores rare, on aerial mycelium, 10.7–21.4 μm long, 8.5–10.8 μm wide. Branched, dark brown rhizoids and (or) pale brown haustoria with globose tips were observed (Fig. 1). In some cases typical zygospores and haustoria appeared in non-sporulating colonies.

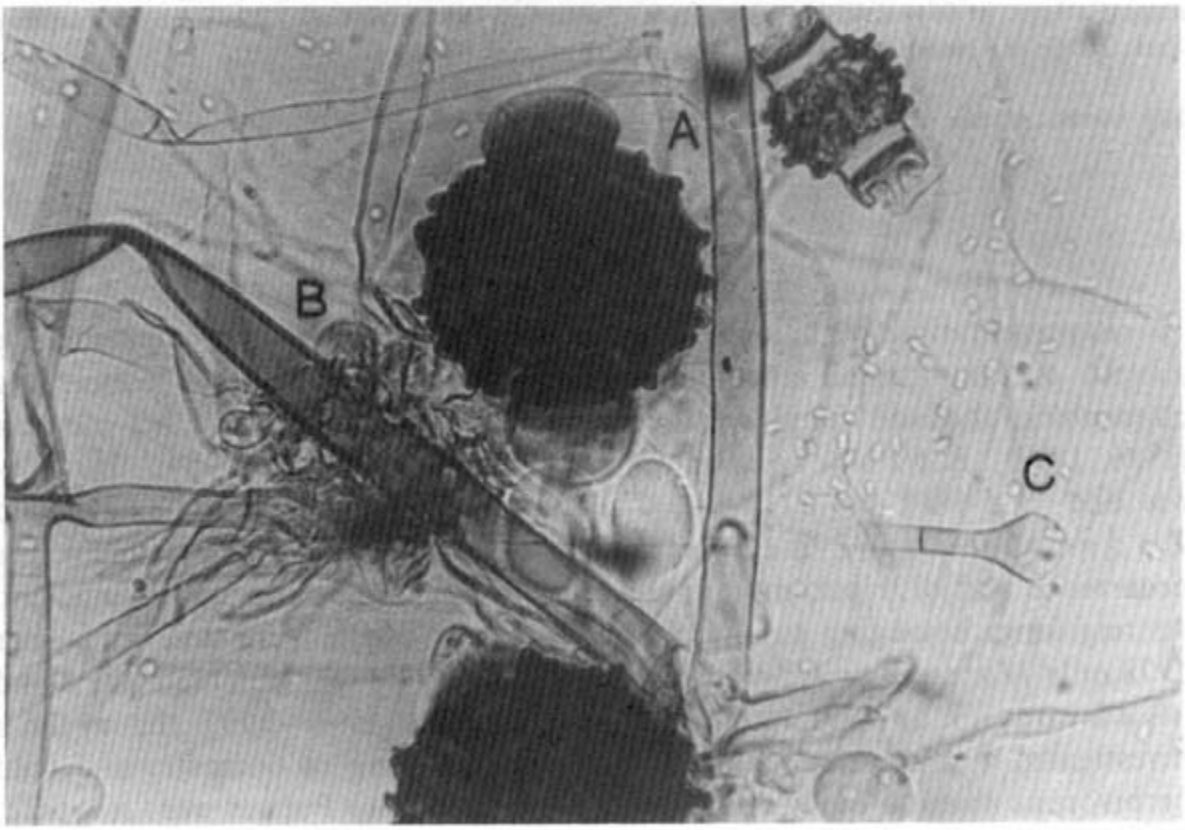

Fig. 1. *Absidia parricida* ×500. A – zygospore, B – haustoria, C – sporophore with columella

Absidia parricida seems to be frequently occurring species. Its strains were isolated from pinewood soil in Kusięta – Góry Towarne near Częstochowa, Puszcza Biała – Wielgolas, Kielce, Wólka Gołębiowska near Puławy, Latowicz and Rogalin; from hornbeam forest soil in Ruciane Nida, Kozłów, Grabina Reserve – Wielkopolski National Park, Kabaty near Warsaw and Miłomłyn near Ostróda; from spruce forest soil in Jabłonka near Olsztyn, Parciaki, Tatrzański National Park, Wigierski National Park and Karpacz; and also from mixed forest soil in Rudka, from beechwood soil in Woliński National Park, from pine-birch forest soil in Mosina, from robinia forest soil in Wielkopolski National Park, from alder carr soil in Dębe, from birchwood soil in Słowiński National Park, and from oakwood soil in Reserve King Jan III Sobieski – Warsaw.

Samples were collected in successive months: April 1996, June 1996, July 1996 and 1997, August 1996 and October 1997.

Dimargaris cristalligena van Tieghem, 1875

Colonies on natural substratum white, woolly, tufty. Sporophores very fragile, always simple without any branches, 0.2 – 0.5(– 1) cm high, 28 – 35 μm wide, white or yellowish, erect, regularly septate, with discoideus enlargement in central part of septa, producing fertile terminal heads. Terminal enlargment 53 – 86 μm in diameter. Spore heads composed of many sporiferous branchlets which arise from enlargment, consisting of short chains of cells formed by budding. Each cell gives rise to a whorl of 2-spored merosporangia which give rise by budding too. Merosporangia 8.4 – 12.7 μm long, 2.1 – 2.5 μm wide. Spores finnaly separating immersed in liquid at maturity, smooth, ovoid or elipsoid, 4.2 – 8.5 μm long, 2.1 – 5.5 μm wide. Rhizoides short, septate, rarely branched. Chlamydospores and zygospores were not observed (Fig. 2C).

Found several times on pellets of small rodents: bank vole (*Clethrionomys glareolus*), striped field mouse (*Apodemus agrarius*) and yellow-necked mouse (*Apodemus flavicollis*) in Wielkopolski National Park in July 1996 and August 1997.

Mortierella gamsii Milko, 1974

Colonies on PDA sparse, bushy, white and shiny. Sporophores 377 – 468 μm high, 5 – 6 times sympodialy branched, subulate or cylindricaly-subulate, rarely septate, 21.4 – 27.8 μm wide at the basis, 3 – 4 μm below sporangium. Sporangia multispored, 25.7 – 60 μm in diameter. Collar well-defined. Spores ovoid or, irregular, smooth, olive-grey, 4.2 – 8.5(– 10.5) μm long, 4.2 – 6.5 (– 8.5) μm wide. Zygospores and chlamydospores not observed (Fig. 2A).

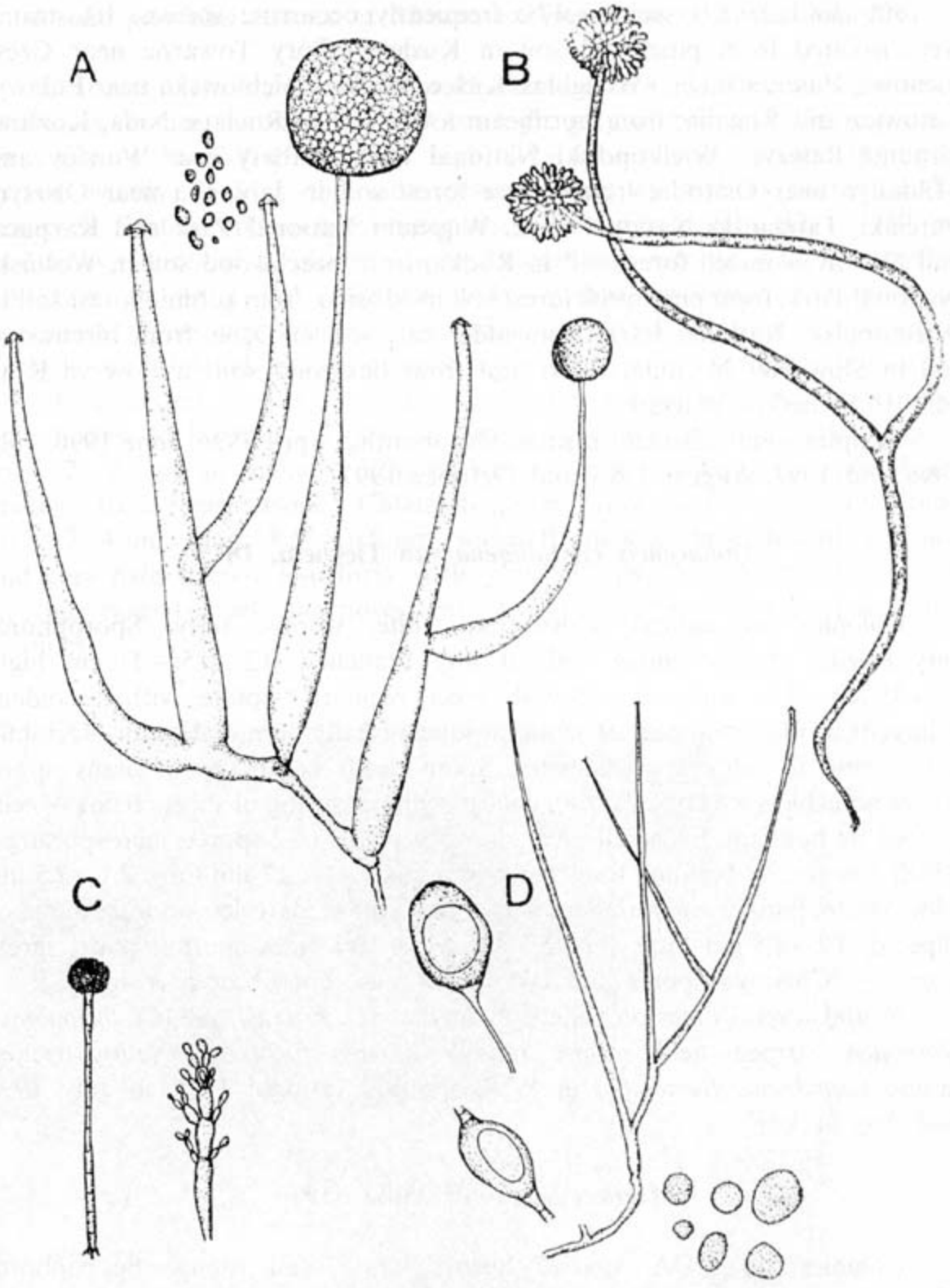

Fig. 2. A — *Mortierella gamsii*, sporophore and sporangiospores ×150; B — *Spinalia radians*, sporophore with fertile heads ×300; C — *Dimargaris cristalligena* sporophore with fertile head ×12, on the right, sporiferous branchlet consisting of short chains of cells formed by budding and whorls of two-spored merosporangia ×300; D — *Mortierella sclerotiella*, sporophore ×60, chlamydospores and sporangiospores ×120

It was found only once in July 1997 on spruce forest soil in Tatrzański National Park – Myślenickie Turnie.

Mortierella sclerotiella Milko, 1967

Colony cottony, white, 1–2 cm high, with a garlic-like odour. Sporophores arising from the substratum and from aerial hyphae, 250–700 μm high, smooth, 5–6 times sympodialy branched, rarely septate, 10.7–12 μm wide at the basis, 2–3 μm below sporangium. Sporangia few-spored, (6.3–) 11.5–25 μm in diameter, with deliquescent wall. Spores olive, globose to subglobose, sometimes irregular 4.5–8.5 (–16) μm long, 4.0–6.5 (–14.9) μm wide, with a minute striate ornamentation. Chlamydospores frequent, lemon-shaped, yellow, 21–40 μm long, 10.7–17.5 (–27) μm wide, filled with oil drops (Fig. 2D).

Mortierella sclerotiella was collected twice in July 1997: from soil of spruce forest in Tatrzański National Park-Dolina Białego and from dung of yellow-necked mouse (*Apodemus flavicollis*) in Wielkopolski National Park – Grabina Reserve.

Spinalia radians Vuillemin, 1904

Colonies on *Mucor hiemalis* grey or orange-grey, fragile, slender, 0.1–0.4 cm high. Sporophores ascending on sporophores of mucoraceous fungi are nonseptate, long and thin, 4.3–8.5 μm wide, hyaline with several, greenish granules in the hyphae. Terminal, globose enlargement of the sporophore 14.9–36.4 μm in diameter, gives rise to many two-spored merosporangia 8.4–12.7 μm long, 1.9–2.5 μm wide. The second spore in the merosporangium is formed by the basal one. Spores ellipsoidal-cylindrical, 4.2–6.4 μm long, 1.9–2.5 μm wide. Stolones, rhizoides and haustoria not observed (Fig. 2B).

Found five times on pellets of small rodents: bank vole (*Clethrionomys glareolus*) and yellow-necked mouse (*Apodemus flavicollis*) in Wielkopolski National Park in July 1996 and August 1997.

DISCUSSION

The results obtained indicates that *Absidia parricida* is a widespread species in Poland. It is noteworthy that in spite of intensive, long-term study in the territory of Slovakia and Czech Republic (V á ň o v á 1980, 1983, 1985) *A. parricida* was not recorded. S c h i p p e r (1990) included *A. parricida* into the group of *Absidia* of uncertain position, but in our opinion

it could be accepted as a distinct species which belongs to subgenus *Mycocladus* which is distinguished from *Absidia* by free zygospores without appendages on suspensores. Schipper (1990) demonstrated that zygospores appeared at high temperatures: 30°–36°C. Our studies did not confirm the thermophilic nature of the strains of *A. parricida.*

Spinalia radians seems to be an extremely rare species. This is the second site of this species recorded so far, the first being in France, where the holotype was collected in 1904. In 1992 the senior author recorded two strains of *Spinalia* on dung of bank vole and yellow-necked mouse in deciduous forest in Białowieża National Park. The sporophores of the strains of *Spinalia* sp. were 1–1.5 μm wide, terminal enlargements of the sporophores about 10 μm in diameter and spores 10–11 μm long and 2–3 μm wide. The fungus resembled *Spinalia tenuis*, the second species of the genus *Spinalia.* The spores of *S. tenuis* were however, much wider than in the strains found by the author. Their width was similar to that of spores of *S. radians.* The intermediate morphology of the strains found by the author suggested that *S. tenuis* and *S. radians* might represent one species with variable spore morphology.

Our record of *Mortierella sclerotiella* is the second one after the description by Milko in 1967 (Milko 1974). This species first was collected from mouse excrements near Kiev. Our strains differed from those described originally in heaving a well-developed aerial mycelium and in some features of chlamydospore. In our opinion this strain should be retained as *M. sclerotiella* due to the presence of finely roughened spores.

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REFERENCES

Badura L., Badurowa M. 1964. Występowanie grzybów glebowych w zbiorowisku bukowym rezerwatu Lubsza. Acta Soc. Bot. Pol. 33: 507–525.

Bebłowska M. 1991/1992. Four noteworthy coprophilic *Mucorales* from Eastern Poland. Acta Mycol. 27 (2): 271–276.

Hesseltine C. W., Ellis J. J. 1961. Notes on *Mucorales*, especially *Absidia.* Mycologia 53: 406–426.

Krzemieniewska H., Badura L. 1954. Przyczynek do znajomości mikroorganizmów ściółki gleby lasu bukowego. Acta. Soc. Bot. Pol. 23: 727–776

Milko A. A. 1974. Opredelitel mucoralnych gribov. Kiev.

Schipper M. A. A. 1990. Notes on *Mucorales*-I, Observations on *Absidia.* Persoonia 14 (2): 133–148

Schroeter J. 1886. *Mucorinaei.* Pilze Schlesiens, I: 198–217, Breslau.

Schroeter J. 1897. *Mucorinaea.* In: Engler-Prantl, Naturl. Pfanzenfam. 1 (1): 119–134, Leipzig.

Skirgiełło A., Zadara M. 1979. *Mucorales*. In: A. Skirgiełło, M. Zadara, M. Ławrynowicz, Flora Polska. Grzyby (*Mycota*) 10. Warszawa–Kraków: 7–273..
Tieghem P. 1875. Nouvelles recherches sur les Mucorinees. Ann. Sci. Nat. 6 ser. 1: 5–175.
Váňová M. 1980. Genus *Absidia* van Tiegh. (*Mucorales*) in Czechoslovakia I, Česka Mykol. 34: 113–122.
Váňová M. 1983. *Ditto*. II, Česka Mykol. 37: 151–171.
Váňová M. 1985. *Ditto*. III, Česka Mykol. 39: 85–96.
Vuillemin P. 1904. Le *Spinalia radians* g. et sp. nov. et la série des Dispirées. Bull. Soc. Mycol. Fr. 26: 33.
Zadara M. 1977. Kilka uwag o rzadko spotykanych przedstawicielach *Mucorales*. Acta Mycol. 13: 175–178.

Kilka grzybów z klasy *Zygomycetes* nowych dla Polski

Streszczenie

Autorzy badali glebowe i koprofilne grzyby z klasy *Zygomycetes*. Próby pobierano z terenu całej Polski, między innymi w Parkach Narodowych: Słowińskim, Wigierskim, Wolińskim, Wielkopolskim i Tatrzańskim. Znaleziono pięć rzadkich, nowych dla Polski gatunków grzybów. Są to: *Absidia parricida*, *Dimargaris cristalligena*, *Mortierella gamsii*, *Mortierella sclerotiella* i *Spinalia radians*.