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Macromycetes of the South Shetland Islands (Antarctica)

ABSTRACT: This paper reports the species of macromycetes collected on King George Island and Livingstone Island (South Shetlands). Brief notes on taxonomy and distribution of the species are added.

Key words: Antarctica, South Shetland Islands, macromycetes, distribution.

Introduction

Flora of the Antarctic macromycetes is rather poor because of lack of mycorrhiza fungi. In spite of some papers on the subject already appeared (Pegler, Spooner and Smith 1980, Horak 1982, Agerer 1984, Gamundi and Spideni 1987) our knowledge on flora and distribution of the Antarctic macromycetes is still insufficient and fragmentary.

This paper is the contribution to the knowledge of macromycetes of the Antarctic area and as a new for King George and Livingstone Islands.

The material reported here was collected by the third author during three Polish Antarctic Expeditions of Polish Academy of Sciences to the *Arctowski* Station in the years: 1986–1988, 1989/90 and 1991–1993.

A description of the climatological conditions, soils and vegetation of the study area is given in the papers by Lindsay (1971), Everett (1976), Lewis-Smith (1984), Olech (1989, 1993), Tatur (1989) and Rakusa-Suszczewski, Miętus and Piasecki (1993).

Species determinations are based on dry material and on few notes made *in situ* from fresh material.

All collections are deposited in the Herbarium of the Institute of Botany of the Jagiellonian University (KRA).

Results and discussion

Arrhenia salina (Høiland) Gulden

= *Leptoglossum salinum* Høiland

= *L. littorale* Høiland

Basidiocarp mesopodial. Pileus 8–10 mm, with crenulate to lobed margin, pale brown, at first flat, than becoming centrally depressed or even infundibuliformis, translucently striate. Hymenophore almost lamellate with distant folds forked and anostomosed (Fig. 1a). Stem 3–8 × 2 mm, central, terete, a little tapering, with white tomentose base.

Basidiospores prevailing 7 × 5.5 μm, lacrymoid even subglobose, with distinct hilar appendix, hyaline, smooth (Fig. 1b). Basidia 4-spored. Cystidia absent. Clamps present, especially reach in stipitepellis (Fig. 1c).

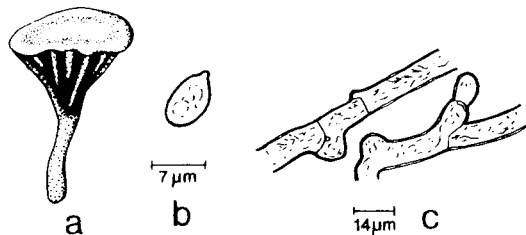


Fig. 1. *Arrhenia salina*: a --- basidiocarp; b --- spores; c --- clamps in stipitepellis.

Basidiocarps were found growing between mosses: *Tortula grossiretis*, *Drepanocladus uncinatus*, *Polytrichum alpinum*, *Desmatodon heimii*, *Ceratodon* sp. and also lichens: *Xanthoria candelaria*, *Physconia muscigena*, *Cladonia* sp. and alga *Prasiola crispa*.

Localities: South Shetlands. King George Island, Admiralty Bay region, Ornithologists Creek valley, near sea beach, alt. 5 m, 14.03.1992; Rakusa Point, 12.03.1992; moraine of Ecology Glacier, near penguins colony, 22.04.1992; Hala, near penguins colony, 10 m, 10.03.1992.

Arrhenia salina was described by Høiland as *Leptoglossum littorale* in Norway in 1976. On account of some mistakes in literature, Høiland (1982) proposed for this species a new name: *Leptoglossum salinum*. Gulden (1987a) and Gulden and Jenssen (1988) displaced this species to the genus *Arrhenia*. After Gulden and Jenssen (1988) *Arrhenia salina* is known from Arctic and Subarctic regions (northern Norway, Svalbard and Arctic Alaska).

Galerina pseudomycenopsis Pilát apud Pilát et Nannfeldt= *Galerina pumila* (Fr.) Favre f. *oreina* Favre= *Galerina moelleri* Bas

Pileus 8–30 mm hemispherical or broadly conical, becoming convex to plane, rarely umbonate, yellow brown to ochre. Lamellae adnate to faintly

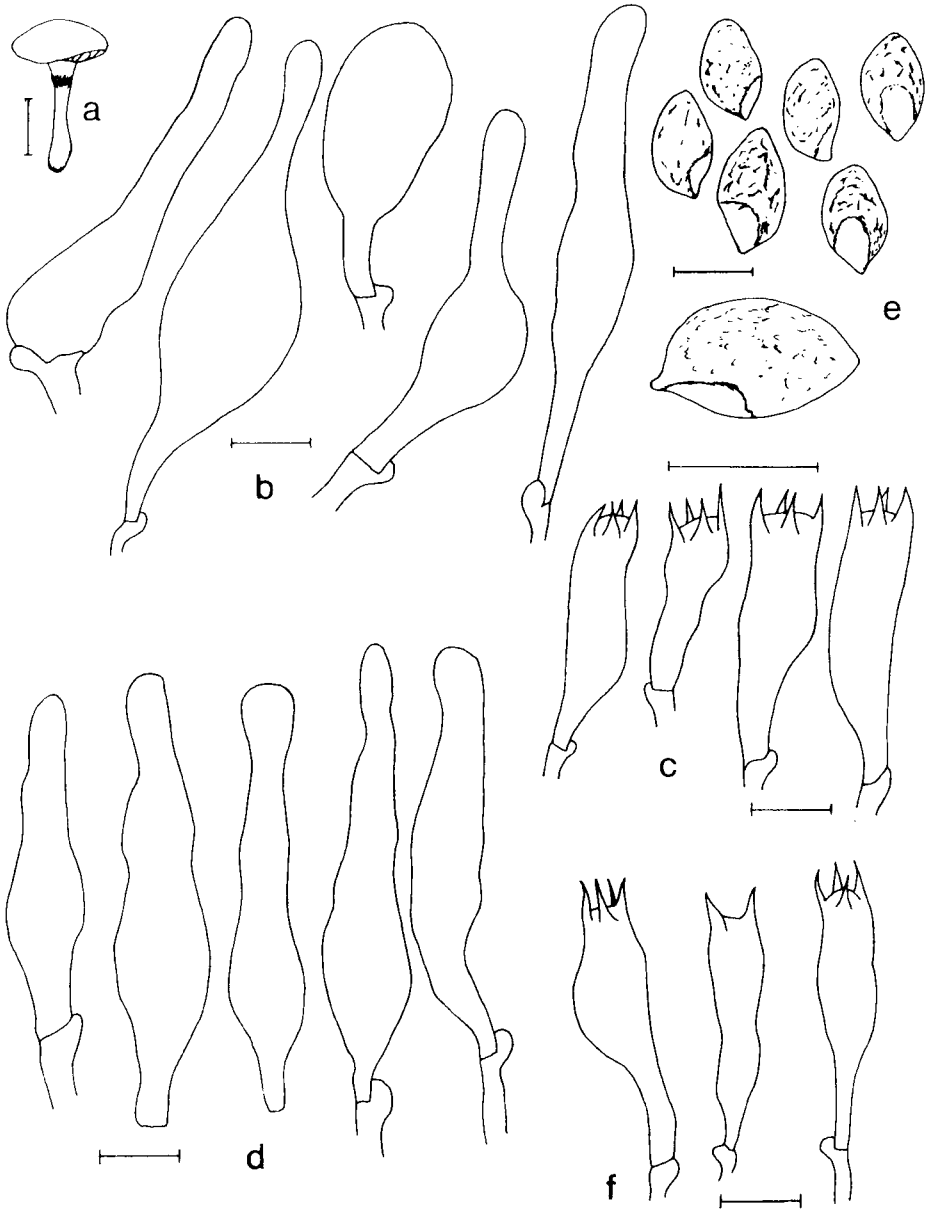


Fig. 2. *Galerina pseudomycenopsis*: a -- basidiocarp; b -- caulocystidia; c, f -- basidia; d -- cheilocystidia; e -- spores (a, b, c, d, e -- KRA/8, f -- KRA/8). Scale bar: a = 10 mm; b, c, d, e, f = 10 µm).

decurrent, moderately close, rusty brown. Stem 25–45 × 1–5 mm, equal, sometimes compressed, fistulose, with membranous ring in apical part, below the ring fibrillose, above pruinose, ochre to brown, bistre from base.

Spores 9.4–11.6(–13.3) × 6.5–7.7(–8.1) μm, broadly amygdaliform, ovoid or citriform, with distinct plage and small pore, rusty brown, marbled to rugulose, exospore not loosening. Basidia 27–35 × 7.7–9.4 μm, 2-, 4-spored. Cheilocystidia 35–85 × 7.3–12.9 × 3.8–5.5 × 3.4–6.9 μm, fusoid ventricose with rounded or capitate apex, hyaline. Pleurocystidia few to numerous. Caulocystidia restricted to stipe apex. Pleuro- and caulocystidia similar to cheilocystidia. Pileipellis of radially repent filiform hyphae 2–5 mm wide, upper part gelatinized, and a subpellis of inflated, short- to medium-celled, brown incrustated hyphae 5–15 μm wide. Clamp present at all septa (Figs 2 and 3).

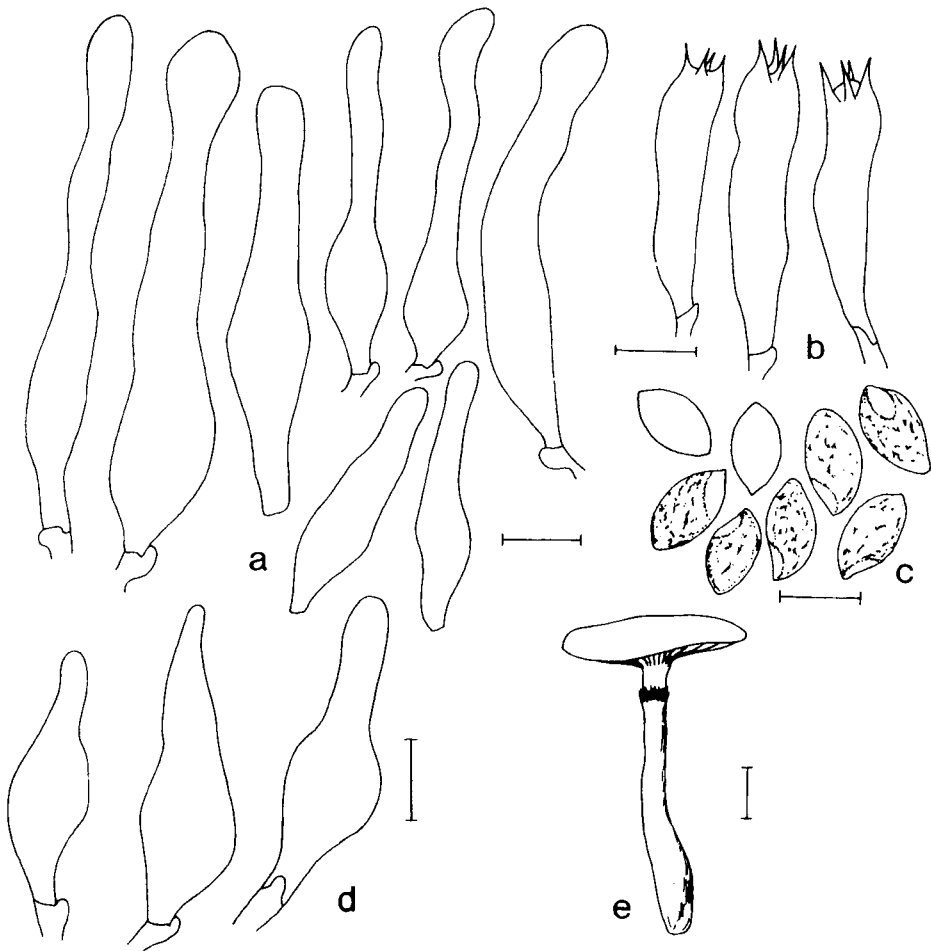


Fig. 3. *Galerina pseudomycenopsis* (KRA/19): a — cheilocystidia; b — basidia; c — spores; d — caulocystidia; e — basidiocarp. Scale bar: e = 10 mm; a, b, c, d = 10 μm.

Basidiocarps were found growing between grass *Deschampsia antarctica*, and mosses: *Drepanocladus uncinatus*, *Polytrichum alpinum*, *P. juniperinum*, *Calliergidium austro-stramineum*, *Pohlia nutans*, *Tortula grossiretis*.

Localities: South Shetlands. King George Island, Admiralty Bay region, Jasnorzewski Gardens, 2.03.1987, 25.03.1987; 21.02.1989; 14.02.1990; 14.03.1992; Ornithologists Creek valley, 15.03.1987; 14.05.1992; Rakusa Point, 15.03.1987; Point Thomas "Jedynka", 16.03.1987; Uchatka Point, 15 m, 16.02.1990; Point Thomas above Ezcurra Inlet, 30 m, 16.05.1987; Livingston Island, valley of creek near *Juan Carlos I* Base, 25 m, 23.02.1990.

Galerina pseudomycenopsis is variable in gross morphology (Gulden 1987b). This characteristic species of moist Arctic-alpine habitats has been given many names (Kühner and Lamoure 1965, Horak 1982, 1993, Gulden, Jenssen and Stordal 1985, Gulden 1987b).

General distribution: Alps (Switzerland, France). Faerøes, Norway, Scotland, Russia, Sweden, Svalbard, Arctic Alaska (USA, N-Rocky Mts.), Arctic Canada, Greenland, Argentina, Antarctica and Subantarctica (Horak 1993).

Omphalina antarctica Singer

Pileus up to 20 mm, disc depressed or a little concave, smooth, fuliginosus, margin non-striate. Lamellae decurrent, distant, concoloured with pileus, with darker edge. Stem up to 10 mm, central, terete concolorous with pileus.

Basidiospores $5-7.5 \times 4-4.5 \mu\text{m}$, ovoid, hyaline (Fig. 4a). Cystidia absent. Clamps present. Hyphae in pileus minutely incrustated (Fig. 4b).

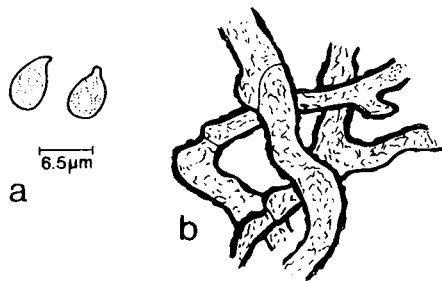


Fig. 4. *Omphalina antarctica*: a — spores; b — hyphae in pileus minutely incrustated ($\times 1000$).

Basidiocarps were found between mosses: *Drepanocladus uncinatus*, *Bryum pseudotriquetrum*, *Bryum* sp., *Tortula excelsa*, *Dicranoweisia grimmiacea*, *Pohlia nutans*.

Localities: South Shetlands. King George Islands, Admiralty Bay region, near *Arctowski* Station, 23.01.1987; moraine of Ecology Glacier, 23.02.1992; Livingston Island, South Bay region, near *Juan Carlos I* Base, 24.02.1990.

Omphalina antarctica was described by Singer in 1956. After Horak (1982) it seems to be the common species in the Antarctic as well as in Subantarctic areas. It is characterized by the fuliginous colour of the basidiocarps.

Omphalina pyxidata (Bull.: Fr.) Quél.

Pileus up to 15 mm broad, yellowish brown. Lamellae decurrent, distant, concolorous with pileus. Stem up to 20 mm, central, cylindric, yellowish brown.

Spores 7–8 × 5.5 μm, ellipsoid, hyaline (Fig. 5a). Basidia 4-spored. Cystidia absent. Clamp connections present (Fig. 5b).

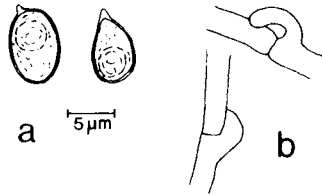


Fig. 5. *Omphalina pyxidata*: a --- spores; b --- hyphae with clamps.

Basidiocarps were found between mosses: *Drepanocladus uncinatus*, *Polytrichum alpinum*, *P. juniperinum*, *Pohlia nutans*, *Tortula grossiretis*, *Bryum* sp., *Ceratodon grossiretis*, *Bartramia patens*; liverworts: *Cephaloziella varians* and *Barbilophozia hatcheri*; algae: *Prasiola crispa*; lichens: *Leptogium puberulum*, *Psorma hypnorum*; and between higher plants: *Deschampsia antarctica* and *Colobanthus quitensis*.

Localities: South Shetlands. King George Island, Admiralty Bay region, Ornithologists Creek valley, 12.03.1992; 14.03.1992; 23.03.1992; 26.04.1992; 14.05.1992; Point Thomas "Jedyńka", 16.03.1987; Hala, 15 m, 5.03.1987; 1.05.1987; 10.03.1992; Ecology Glacier moraines, 10, 25, 50, 80 m, 9.03.1992; 11.03.1992; 12.03.1992; 26.04.1992; Izolda IV, 50 m, 15.03.1987; Hill with grave of Puchalski NE, 50 m, 3.04.1987; Ambona N. 80 m, 23.01.1990; Keller Peninsula, Barton Buttress, 100 m, 5.03.1987; Jersak Hills, 180 m, 23.03.1987.

Omphalina pyxidata is considered as Subantarctic species (Horak 1982). It is known also from Scandinavian mountains and from high localities in the Alps (Lamoure 1974).

References

- AGERER R. 1984. *Leptoglossum omnivorum* sp. nov. from Antarctica. — Trans. Brit. Mycol. Soc., 82(1): 184–186.
- EVERETT K.R. 1976. A survey of the soils in the region of the South Shetland Islands and adjacent part of Antarctic Peninsula. — Ohio State Univ., Inst. Polar Stud. Rep., 51: 1–49.
- GAMUNDI I.J. and SPIDENI H.A. 1987. *Sclerotinia antarctica* sp. nov., the telemorph of the first fungus described from Antarctica. — Mycotaxon, 29: 81–89.
- GULDEN G. 1987a. Studies in the agarics of Svalbard. I. New species and combinations (Tricholomataceae). — Sydowia, 40: 51–59.
- GULDEN G. 1987b. The genus *Galerina* on Svalbard. In: G.A. Laursen, J. F. Ammirati & S.A. Redhead (eds.), *Arctic and alpine mycology, II*. — Plenum Press, New York; 177–204.

- GULDEN G. and JENSSEN K.M. 1988. Arctic and Alpine Fungi, 2. — Soopkonsulentent, Oslo; 58 pp.
- GULDEN G., JENSSEN K.M. and STORDAL J. 1985. Arctic and Alpine Fungi, 1. — Soopkonsulentent, Oslo; 62 pp.
- HØILAND K. 1976. The genera *Leptoglossum*, *Arrhenia*, *Phaeotellus* and *Cyphellostereum* in Norway and Svalbard. — *Norw. J. Bot.*, 23(4); 201–212.
- HØILAND K. 1982. *Leptoglossum salinum* nom.nov., a new name for *L. littorale* Høiland. — *Trans. Brit. Mycol. Soc.*, 79(2): 342–343.
- HORAK E. 1982. Agaricales in Antarctica and Subantarctica: distribution, ecology and taxonomy. In: G.A. Laursen & J.F. Ammirati (eds.), *Arctic and alpine mycology*. — Univ. Washington Press, Seattle, London; 82–122.
- HORAK E. 1993. Distribution and ecology of Arctic-alpine species of *Galerina* and *Phaeogalera* in the northern and southern hemisphere. — *Sydowia*, 44; 346–376.
- KÜHNER R. and LAMOURE D. 1965. *Galerina moelleri* Bas = *Pholiota pumila* (Fr.) Karst. ss. Möller. — *Bull. Soc. Mycol. Fr.*, 81: 243–257.
- LAMOURE D. 1974. Agaricales de la zone alpine genere *Omphalina* (1^{ère} partie). — *Trav. Sc. Parc Nat. Vanoise*, 5: 149–164.
- LEWIS-SMITH R.I. 1984. Terrestrial plant biology of the sub-Antarctic and Antarctic. In: R.M. Laws (ed.), *Antarctic ecology*. — Academic Press, London; 61–162.
- LINDSAY D.C. 1971. Vegetation of the South Shetland Islands. — *Br. Antarct. Surv. Bull.*, 25: 59–83.
- OLECH M. 1989. Preliminary Botanical Studies in Johnson Dock Area (Livingston, Antarctica). *Bull. Pol. Acad. Sci., Biol. Sci.*, 37 (7–9): 223–230.
- OLECH M. 1993. Lower plants. In: S. Rakusa-Suszczewski (ed.), *The Maritime Antarctic Coastal Ecosystem of Admiralty Bay*. — Department of Antarctic Biology, Pol. Acad. Sci., Warsaw; 173–179.
- PEGLER D.N., SPOONER B.M. and SMITH R.I.L. 1980. Higher fungi of Antarctica, the Subantarctic zone and Falkland Islands. — *Kew Bull.*, 35: 499–562.
- RAKUSA-SUSZCZEWSKI S., MIĘTUS M. and PIASECKI J. 1993. Weather and climate. In: S. Rakusa-Suszczewski (ed.), *The Maritime Antarctic Coastal Ecosystem of Admiralty Bay*. — Department of Antarctic Biology, Pol. Acad. Sci., Warsaw; 19–25.
- SINGER R. 1956. A fungus collected in the Antarctic. — *Beihefte zur Sydowia*, 1: 16–23.
- TATUR A. 1989. Ornithogenic soils of the maritime Antarctic. — *Pol. Polar Res.*, 10: 481–532.

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Streszczenie

W zebranych materiałach na wyspach archipelagu Szetlandów Południowych (King George i Livingston) stwierdzono 4 gatunki macromycetes: *Arrhenia salina* (KG), *Galerina pseudomycesopsis* (KG, L), *Omphalina antarctica* (KG, L) oraz *O. pyxida* (KG). Pierwszy z tych gatunków nie był dotąd notowany w Antarktyce, zaś stanowiska pozostałych rozszerzają dotychczasowe wiadomości o ich rozmieszczeniu.

Na kilku rysunkach (1–5) przedstawiono elementy morfologii znalezionych gatunków.