

A contribution to the chorology of some Gasteromycetes in Poland

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Several new localities of *Scleroderma areolatum* Ehrenb., *Disciseda bovista* (Klotzsch) P. Hennigs, *Mycenastrum corium* (Guersent ex Lam. et D.C.) Desv., and *Pisolithus arhizus* (Pers.) Rausch., mostly in central Poland, are established. Maps of their distribution regarding all localities known till now in Poland are presented in the paper.

INTRODUCTION

As a result of a stay of the first author in Poland at the University of Łódź, a joint study of all materials belonging to *Gasteromycetes*, preserved at that Herbarium (LOD), was made. There were several interesting and rare species found among the examined collection which we would like to present here as a contribution to the actual state of knowledge on the chorology of *Gasteromycetes* in Poland.

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DESCRIPTION OF SPECIES

Scleroderma areolatum Ehrenb., Sylvae Mycol. Berol. 15 and 27 (1818).

Syn.: *S. lycoperdoides* Schwein., Schrift. Naturforsch. Gesellsch. Leipzig 1:61 (1822).

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Carpophore globose 2-5 cm in diameter with a small stipe up to 2 cm in length. Peridium typically yellow with uniform scales of a dark brown colour widespread on all the surface. When the carpophores are ripe the scales become isolated, being then surrounded by some kind of areola which is clearly visible. Finally, the opening of the carpophore takes place by the breaking down of the peridium at the top. The gleba shows a yellow brown colour, being brownish the spore deposit.

Under the microscope the peridium appears made up by hyphae of a cylindrical shape, with granular pigmentation in the external layer and without clamp-connections. The spores are spherical or globose, with a spiny surface and with a diameter of 9-14 μm , apart from the spines which have a length of 1,5 μm approximately (Fig. 1 A).

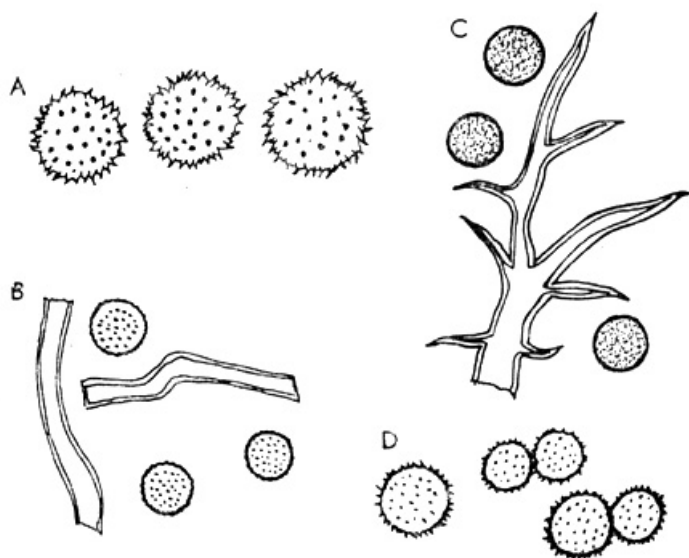


Fig. 1. Spores of: A — *Scleroderma areolatum* (spores), B — *Disciseda bovista* (spores and capillitium), C — *Mycenastrum corium* (spores and capillitium), D — *Pisolithus arhizus* (spores)

Habitat: The observed material was collected mostly in deciduous forests with *Quercus robur*, on a fairly rich clay soil from August until October.

Localities (Fig. 1A).

1. Dębek — a little fishing village on the Baltic seaside, under deciduous shrubs near Piaśnica river, 9 VIII 1934 (Teodorowicz 1936)

(under the name of *S. lycoperdoides* Schw.). — 2. Poznań, 17 VIII 1967, leg. et det. H. Kreisel (Herb. Kreisel, MEXU) (Guzman 1970). — 3. Ostrowy nature reserve, near Kutno, *Tilio-Carpinetum*, 4 IX 1967, leg. M. Ławrynowicz, det. F. D. Calonge (LOD). — 4. Podkowa Leśna near Warsaw, deciduous forest, under *Quercus robur*, 3 X 1970, leg. M. Ławrynowicz, det. F. D. Calonge and M. Ławrynowicz (LOD). — 5. Szczawin, *Tilio-Carpinetum* with *Abies alba*, 6 X 1974, leg. I. Józefowicz, det. F. D. Calonge (LOD). — 6. Łagiewniki near Łódź, mixed forest, 1 X 1973, leg. Z. Ławnicka, det. F. D. Calonge (LOD). — 7. Lubiaszów nature reserve, *Tilio-Carpinetum*, 6 IX 1972 leg. G. Drzeń, det. F. D. Calonge (LOD). — 8. Januszewice near Opoczno, *Potentillo albae-Quercetum*, 10 VIII 1972, leg. G. Drzeń, det. F. D. Calonge.

Observations. According to Demoulin (1968), this species is known in North America under the name of *S. lycoperdoides*. This author also says that *S. areolatum* is frequently mistaken for *S. verrucosum* by most European mycologists, and it is possible that the former is as common or even more common than *S. verrucosum* in Europe.

As a matter of fact *S. areolatum* grows commonly from the Scandinavian countries to Spain (Calonge, Demoulin 1975).

Disciseda bovista (Klotzsch) P. Hennings, Hedwigia 42: 128, 1903.

Carpophore globose 2-4 cm in diameter, sessile, similar in aspect to that shown in *Bovista plumbea*. The exoperidium is very thin, disappearing soon at maturity in the lower half and remaining on the other half. It has a white colour with attached sand particles from the soil where it grows. The endoperidium is more resistant, with papyraceous consistency and a dark brown colour; opening the ostiole at the base of the carpophore and turning up itself, later on, in order to allow the liberation of the spores. The gleba is dark brown and the spore deposit of the same colour.

Under the microscope the exoperidium appears made up of two layers; one pseudoparenchymatous and the other filamentous. The spores are globose, of 6-8 μm in diameter and with prominent warts on the surface; capillitium without septa, with thin walls and quite uniform in size (Fig. 1 B), detailed description of *D. bovista* found in Poland is given by Rudnicka (1959).

Habitat: Poor pastures with vegetation of *Sedo-Scleranthetea*.

Localities (Fig. 1B, 2B).

1. Poznań-Gołącin — bushes of *Betula* and *Robinia pseudoacacia*, 22 IX 1933 (Tedorowicz 1939). — 2. Warsaw-Marymont — neglected area on sandy soil, 22 and 26 X 1957 (Rudnicka 1959). — 3. Warsaw-Buraków — dry, sandy soil with scanty vegetation, 22 and

26 X 1957 (Rudnicka 1959). — 4. Maluszyn by Pilica river — sandy soil covered by scanty vegetation of *Sedo-Scleranthetea*, 17 IX 1973, leg. M. Ławrynowicz, det. F. D. Calonge (LOD).

Observations. The genus *Disciseda* is unique for its typical way of liberation of the spores. *D. bovista* has been found in most countries of Europe from Scandinavia to Spain, being quite close to *D. calva* (Morav.) Morav. and *D. arida* Valen., but the former (*D. calva*) has smaller size in the carpophores (1-2 cm) and spores (4-5,5 μm) and *D. arida* has spores with a bigger ornamentation. All differences between *D. bovista* and *D. calva* have been analyzed in the paper by Rudnicka (1959).

Mycenastrum corium (Guersent ex Lamb. et D.C.) Desv., Ann. Sc. Nat. Ser. 2, 17, Bot.: 147, 1842.

Carpophore globose with dimensions of 6-13 cm of diameter with a pale cream colour, sometimes almost white. Apparently is sessile without any trace of sterile base or rhizomorph connected to the substrate. The peridium is quite thick (2-3 mm), very hard and showing a brown colour in the texture. The exoperidium is white, papyraceous and breaks down forming scales. The endoperidium is much thicker and with a suberous aspect; dehiscence takes place by means of triangular lobes in an irregular way. The gleba shows brown colour and the spore deposit is chocolate brown.

Under the microscope it is possible to observe the spores of spherical shape, of 8-12 μm in diameter, with a clear reticulated ornamentation on the surface (Fig. 1 C). The capillitium is very typical, formed by isolated fragments up to 13 μm in diameter, without branching, but with long spines which can get up to 20 μm in length (Fig. 1 C). The exoperidium is filamentous and the endoperidium is made up by two layers; the internal one with hyphae without septa and clamp-connections and the external one with both kinds of elements in its structure. This species was described in Poland by Rudnicka-Jezińska (1965).

Habitat: The species has been found on soils containing excrements of animals and seems to be a synanthropic one.

Localities (Fig 1C, 2C): 1. Poznań-Sołacz, in courtyard (Teodorowicz 1939). — 2. Łódź, Zoological Garden, among grasses, 4 VI 1974, leg. L. Makowska, det. F. D. Calonge (LOD). — 3. Grajewo, drying up peat bog Kuwasy, 6 IX 1953, leg. et det. B. Gumińska (KRA). — 4. Wierzbice by Zalew Zegrzyński, the pastures surrounding artificial lake, 19 VI 1972, leg. M. Ławrynowicz, det. F. D. Calonge (LOD). — 5. Warsaw-Saska Kępa, in garden, VI 64, leg. H. Rembertowicz-Szymborska, det.

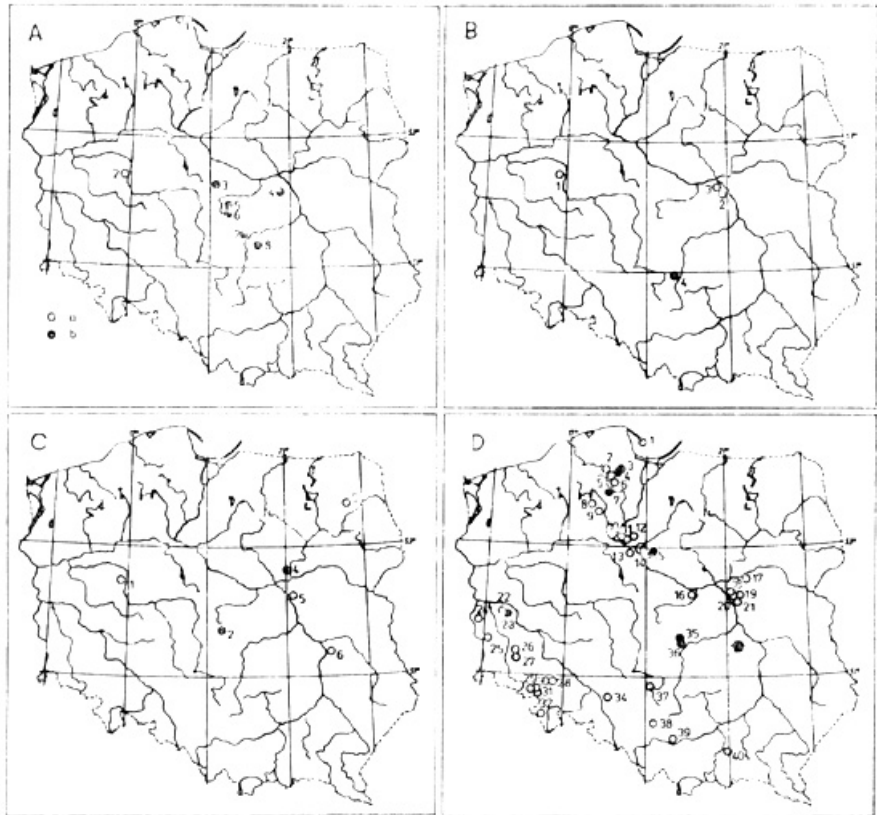


Fig. 2. Distribution of: A — *Scleroderma areolatum*, B — *Disciseda bovista*, C — *Mycenastrum corium* (after Skirgiello 1972, completed), D — *Pisolithus arhizus*

a — according to the literature, b — new localities

W. Rudnicka-Jeziarska (WA 15 667). — 6. Puławy, Forest District Wronów, soil bank, mixed forest, 1 IV 50, leg. et det. H. Stasiak (WA 13 567).

Observations. This species shows a great affinity with the members of the genus *Scleroderma*; e.g. dehiscence of the carpophore, shape and size of spores, peridium structure, etc., but the typical capillitium of *Mycenastrum* separates clearly both genera.

This species was found in Poland mostly in fertile soils (e.g. courtyard, garden, Zoological Garden, fertile pasture), but according to other data considered by Rudnicka-Jeziarska (1965) it is rather

termophilous, growing even on sandy and dry sites, semi-deserts, and southern stoppes.

Pisolithus arhizus (Pers.) Rausch., Zeitschr. Pilzk. 25:51, 1959.

Syn.: *P. arenarius* Alb. et Schwein., Consp. Fung. Lusat. Sup. Agro. Nisk. 82, 1805. *P. tinctorius* (Pers.) Coker et Couch, Gaster. East. Un. States and Canada 170, 1928.

Carpophores of variable size, 4-10 cm of diameter, with oval or globose shape and wearing a well developed pseudostipe made up of compact rhizomorph-like formations, which can get up to 13 cm in length, showing a mixture of brown and sulphur yellow colour. Peridium dark brown with purple tones. Gleba formed by pseudoperidioles and mycelium with a yellowish colour. The spore deposit is brown.

The microscopic observation shows spores of 7-9 μm in diameter, with spherical shape and with spiny ornamentation which can get up to 1 μm in length (Fig. 1D, 2D). The peridium shows hyphae with clamp-connections.

Habitat: In Poland it grows especially on dunes, sandy roads, and the mine dumps. One collection was made in Italy on extremely dry tufts by dormant volcano.

Localities (Fig. 2 D) in voivodships:

Gdańsk: 1. Hel (Rouppert 1910), on dune under an old pine, 29 VII 1932; forest on dune, VII 1931 (Teodorowicz 1933). — 2. Łubiana near Kościerzyna (Caspary 1887). — 3. Barkoczyn, village on Kaszubskie Lakeland, sandy road at *Pinus sylvestris* forest, 27 VII 1973, leg. et det. M. Ławrynowicz (LOD) — 4. Between villages Sarnowy and Juszki on Kaszubskie Lakeland, sandy road at *P. sylvestris* forest, 16 VIII 1973, leg. et det. M. Ławrynowicz (LOD). — 5. Szeneida by Wąglikowic (Caspary 1887). — 6. Grzybno by Konarzyny (Caspary 1887).

Bydgoszcz: 7. Between villages Wojtal and Wiecko at Bory Tucholskie, sandy area in neighbourhood of *Pinus sylvestris* forest, 6 VIII 1974, leg. et det. M. Ławrynowicz (LOD). — 8. Chojnice (Caspary 1887). — 9. Tuchola (Caspary 1887).

Toruń: 10. Przysiek by Toruń, ? VIII 1952 and 23 VIII 1953 (Horbaczewski 1958). — 11. Olek near Toruń (Horbaczewski 1958). — 12. Between Toruń and Chełmża VIII 1953 (Horbaczewski 1958) — 13. Toruń-Stawki, Rudaki (Horbaczewski 1958). — 14. Between villages Dominikowo and Żelaźniki (Kępczyński 1963).

Włocławek: 15. Witowąż (Kępczyński 1963).

Skierniewice: 16. Kamion by Wyszogród, 2 IX 1961, leg. et det. W. Rudnicka-Jeziarska (UW 15 668) (Skirgiełło 1972).

Ostrołęka: 17. Rybienko, *Pinus sylvestris* forest, VIII 1964, leg. et det. A. Skirgiełło (UW 15 718) (Skirgiełło 1972).

Warszawa: 18. Błota, 11 XI 1965, leg. H. Szymborska, det. A. Skirgiełło (UW) (Skirgiełło 1972). — 19. Małralin, VII 1955, leg. B. Hryniewicz, det. A. Skirgiełło (UW 7 579) (Skirgiełło 1972). — 20. Świder (Siemaszko 1924 sub *Queletia mirabilis*), (Skirgiełło 1972). — 21. Otwock (Błoński 1896).

Zielona Góra: 22. Zielona Góra (Schröter 1889). — 23. Zielona Góra, sandy soil, under *Pinus sylvestris*, 15 VIII 1974, leg. L. Makowska, det. M. Ławrynowicz (LOD). — 24. Lubsko, dry meadow, leg. et det. K. H. Marschallik (Fischer 1963). — 25. Howa (Schröter 1889).

Legnica: 26. Grodzanowice (Schröter 1889). — 27. Ośla (Schröter 1889).

Wrocław: 28. Chrzanów (Bail 1860).

Wałbrzych: 29. Sobięcin Górny (Bail 1860). — 30. Wałbrzych (Bail 1860). — 31. Jedlina-Zdrój (Bail 1860). 32. Duszniki-Zdrój (Schröter 1889). — 33. Chościszowice (Schröter 1889).

Opole: 34. Brynica (Schröter 1889).

Piotrków: 35. Karolinów near Nagórzyce, sandy soil in *Pinus sylvestris* forest, 9 VII 1973, leg. M. Stachurski, det. M. Ławrynowicz (LOD). — 36. Lubiaszów, among the young *P. sylvestris* trees on sandy soil, 5 VIII 1972, leg. G. Drzeń, det. M. Ławrynowicz.

Częstochowa: 37. Częstochowa (Błoński 1896).

Katowice: 38. Burki by Maczki, IX 1929, leg. et det. W. Zabłocka and J. Zabłocki (KRAM) 7276).

Kraków: 39. Czernichów-Zagacie, between mosses and lichens on dune, 8 VIII 1960, leg. et det. M. Kuc (KRA).

Tarnów: 40. Czarne Bagno by Ciężkowice (Zabłocka 1931).

Italy: Vulcano Iste, dry tuffs by dormant vulcano, VIII 1978, leg. et det. M. Ławrynowicz and R. Olaczek (LOD).

Observations. It seems to be the only one species existing in Europe; all the other taxa are the simple forms of the same taxon.

The genus *Pisolithus* is very close to *Scleroderma*, but the former can be distinguished by the presence of pseudoperidioles in the gleba and also by the much thinner exoperidium.

CONCLUSIONS

1. The distribution of four species of *Gasteromycetes*: *Scleroderma areolatum* Ehrenb., *Disciseda bovista* (Klotzsch) J. Hennigs, *Mycenastrum corium* (Guersent ex Lam. et D.C.) Desv., and *Pisolithus arhizus* (Pers.) Rausch. is the subject of this paper. The analysis of distribution

of these rare species indicates that in any case there are different causes of this rarity.

2. *Scleroderma areolatum* has been found in Poland only two times till now. After the study of materials in Central Poland according to Demoulin (1968) and Guzman (1970) the number of localities increased to eight. *S. areolatum* is probably as common in Poland as in other countries of Europe.

3. *Disciseda bovista* and *Mycenastrum corium*, pointed out on the maps as very rare, are probably much more common, but the first one is difficult to recognize in the field, as it is easily mistaken for some species of *Bovista* and similarly to *M. corium* it grows on such sites which are rather seldom penetrated by mycologists, e.g. on pastures, courtyards, gardens.

4. A relatively great number of localities where *Pisolithus arhizus* occurs in due to the kind, of its carpophores; this makes it very easy to find them.

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Dane do chronologii niektórych *Gasteromycetes* w Polsce

Streszczenie

W wyniku analizy materiałów zielnikowych Uniwersytetu Łódzkiego podano nowe stanowiska rzadkich i interesujących gatunków wnętrzników. Zamieszczono mapy z uwzględnieniem wszystkich dotychczasowych znanych z literatury stanowisk wyżej wymienionych gatunków w Polsce.