

***SCLERODERMA SEPTENTRIONALE* (FUNGI, BASIDIOMYCETES), FIRST RECORDS FROM CENTRAL EUROPE**

MIKAEL JEPPELSON & MARCIN PIĄTEK

Abstract. *Scleroderma septentrionale* Jeppson, a species hitherto known from North Europe and North America is reported from Central Europe. Three inland localities in Poland and one in southern Slovakia represent a significant range extension of *S. septentrionale*. Its distribution in Europe is mapped. The taxonomy of the species is discussed and a SEM micrograph of the basidiospores is published for the first time.

Key words: gasteromycetes, Poland, Slovakia, sand dunes, *Scleroderma*, Sclerodermataceae

Mikael Jeppson, Lilla Håjumsgratan 4, S-461 35 Trollhättan, Sweden; e-mail: jeppson@sverige.nu

Marcin Piątek, Department of Mycology, W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, PL-31-512 Kraków, Poland; e-mail: mpiatek@ib-pan.krakow.pl

INTRODUCTION

Scleroderma septentrionale Jeppson was recently described as a new species from Northern European sand dunes (Jeppson 1998). It is a highly characteristic species thanks to the presence of reticulate basidiospores typical of the complex of species belonging to *Scleroderma* Pers. sect. *Scleroderma*, and above all, its long pseudostipe, which is usually immersed in the soil as an adaptation to its sandy habitats. Studying the monograph of Polish gasteromycetes (Rudnicka-Jezierska 1991), both of us independently drew attention to an unnamed species of *Scleroderma* with a long rooting stipe collected in mobile dunes in the Puszcza Kampinoska primeval forest near Warsaw. Rudnicka-Jezierska (1991) briefly compared her collection with *Scleroderma macrorrhizon* Wallr. and *Scleroderma meridionale* Demoulin & Malençon, but stated that a final conclusion on its taxonomical status required further studies. However, the description and photographs clearly suggested that the specimens represented *Scleroderma septentrionale*. Examination of the voucher specimens deposited in the Department of Plant Systematics and Geography of Warsaw University (WA) confirmed this. All vouchers had originally been labelled *Scleroderma macrorrhizon*

Wallr. The present finding of *Scleroderma septentrionale* in Poland is surely the most remarkable collection of a gasteromycete fungus in the country in recent years, and accordingly we decided to prepare a separate paper on this discovery. During the preparation of this paper an additional Central European record of *S. septentrionale* was made in South Slovakia, in sand dunes along the Morava River.

MATERIAL AND METHODS

The specimens examined for the present study are cited in the following text. For light microscopy (LM) the spores were mounted on slides in 5% KOH and then observed under a NIKON Eclipse 600 light microscope with Nomarski interference contrast. For scanning electron microscopy (SEM), dry basidiospores were mounted on clean glass and affixed to an aluminum stub with double-sided transparent tape. The stubs were sputter-coated with carbon using a CRESSINGTON sputter-coater and viewed with a Hitachi S-4700 scanning electron microscope at a working distance of 12–13 mm. The SEM micrograph was taken in the Laboratory of Field Emission Scanning Electron Microscopy and Microanalysis at the Institute of Geological Sciences of the Jagiellonian University, Kraków.

RESULTS AND DISCUSSION

Scleroderma septentrionale Jeppson (Fig. 1)
Karstenia 38: 37. 1998.

Basidiomes globose to subglobose, 1.5–3.0 cm in diam. Peridium thin, mostly 1 mm thick, pale ochraceous, yellowish to light brownish with distinct, minute, irregularly rounded brown scales, at the base sometimes in concentric zones. In mature specimens the peridium is open at the top. Old basidiomes become cup-shaped. Gleba greyish brown. Pseudostipe prominent, usually larger than the above-ground part of the basidiomes, 1–2 × 3–5 cm, very incrustated with sand grains. Basidiospores mostly globose, brown, echinulate with reticulate wall, 8.0–15.0 µm in diam.

TYPE SPECIMEN: FINLAND. Oulun Pohjanmaa, Haukipudas, Isoniemi, Saukkoperä, 18 Sept. 1984, *leg. T. Ulvinen, E. Ohenoja & K. Kalamees* (HOLOTYPE: OULU).

SPECIMENS EXAMINED. POLAND. NIZINY ŚROD-KOWOPOLSKIE LOWLANDS: Kamion near Wyszogród, mobile dune, 31 Aug. 1961, *leg. ?* (WA 34947); same locality, near tuft of *Ammophila arenaria*, 20 Aug. 1967, *leg. W. Rudnicka* (WA 34946); same locality,

dune, 20 Aug. 1967, *leg. W. Rudnicka-Jezierska* (WA 33568); same locality, dunes, Sept. 1968, *leg. W. Rudnicka-Jezierska* (WA 34942); same locality, dunes, 28 Aug. 1968, *leg. W. Rudnicka-Jezierska*, (WA *s.n.*); same locality, sand dunes, 31 Aug. 1961, *leg. W. Rudnicka-Jezierska* (WA 33161); Kampinoski National Park, Grochale, mobile sands, 3 Sept. 1968, *leg. W. Rudnicka-Jezierska* (WA 34948); same locality, mobile dunes, 30 Sept. 1968, *leg. W. Rudnicka-Jezierska* (WA 34943); Kampinoski National Park, Polesie, dunes, near clump of birches, 19 July 1962, *leg. W. Rudnicka-Jezierska* (WA 34944). – SLOVAKIA. Záhorie, Moravský Svätý Ján, Borová, under *Pinus* on sand dune, 19 Oct. 2004, *leg. I. Kautmannová & M. Jeppson* (BRA and private herbarium of M. Jeppson).

In addition to *Scleroderma septentrionale*, there are two other European species with a distinctly rooting pseudostipe: *Scleroderma meridionale* Demoulin & Malençon and *S. polyrhizum* (J. F. Gmel.) Pers. They both grow in open sand but have more or less Mediterranean distributions. *S. meridionale* species closely resembles *S. septentrionale* in the size and shape of the basidiomes, but can be distinguished by its smooth to finely furfuraceous peridium and the intense sulphur-yellow color of the pseudostipe. *S. polyrhizum* has larger fruitbodies with an extremely thick

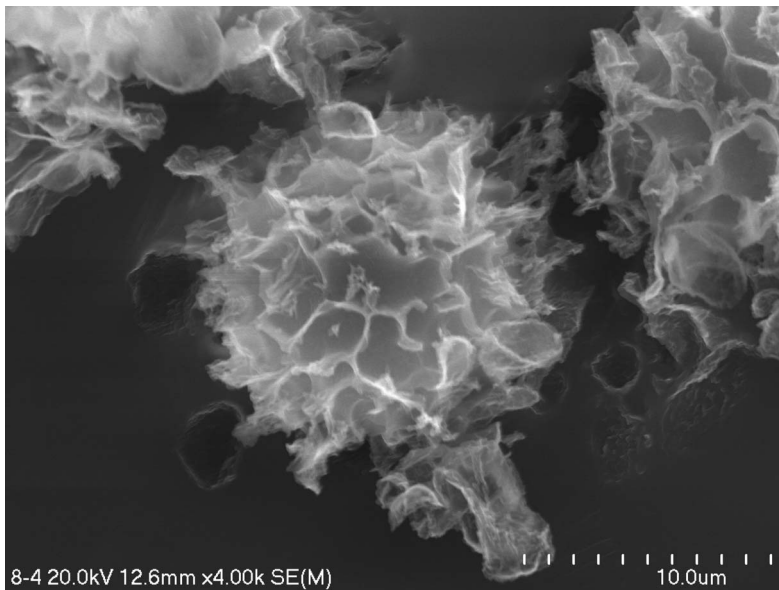


Fig. 1. *Scleroderma septentrionale* Jeppson (WA 34942): SEM micrograph of basidiospores.



Fig. 2. Distribution map of *Scleroderma septentrionale* Jeppson in Europe: triangles indicate new localities.

peridium, and is characterized by more or less hypogeous growth.

Scleroderma septentrionale was originally described from Finland, but in the protologue Jeppson (1998) also mentioned a number of localities in Denmark, Sweden and Iceland. In these countries it is known almost exclusively from sand dunes close to the sea. Jeppson (1998) suggested an association with the milder and more humid microclimatic conditions near the sea. At that time only two localities were known from inland sites: one in Finland in the vicinity of Kuopio, and the other in Iceland near Mount Helgafell.

However, in the U.S.A it occurs at inland localities, from where it was reported for the first time recently by Guzmán and Ovrebo (2000). The three Polish localities as well as the recent record from Slovakia are all in the interior. The occurrence of *Scleroderma septentrionale* is connected with sandy soils, a link supported by the new localities in Poland and Slovakia. The sand dunes of the Puszcza Kampinoska primeval forest are the largest inland mobile sands in Poland, and the banks of the Morava in Slovakia have low sand dunes covered by pine forests. Hence the geographical range of *S. septentrionale* has extended considerably (Fig. 2). It probably occurs at other places with sand dunes. It should be sought along the southern coasts of the Baltic Sea in Germany, Poland, Lithuania, Latvia and Estonia, as well as on inland sand dunes and along sandy banks of big rivers in Central Europe.

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