Zeitschrift: Mycologia Helvetica
Herausgeber: Swiss Mycological Society
Band: 1 (1983-1986)
Heft: 6

Artikel: Taxonomic revision within the genus Sowerbyella
Autor: Moravec, Jii
DOI: https://doi.org/10.5169/seals-1036478

MYCOLOGIA HELVETICA
Vol. I No 6 pp. 427—442 1985

(Manuscript received on 20th September 1985)

TAXONOMIC REVISION WITHIN THE GENUS SOWERBYELLA

Jiří Moravec
Sadová 21/5, č. 336, 679 04 ADAMOV u Brna
Czechoslovakia

Summary: The author continues the taxonomic revision of the genus Sowerbyella (Ascomycetes, Pezizales) published in the previous paper (J.Moravec 1985a). Several other specimens have been examined. Two new combinations, Sowerbyella reguisii (Quél.) comb.nov. and S. pallida (Spooner) comb.nov. are proposed on the basis of the author's revision of the type specimens of Peziza splendens var. reguisii Quél. and Svrcekomyces pallidus Spooner. The type specimens of Sowerbyella imperialis (Peck) Korf and S. brevispora Harmaja have also been examined.
Nine species of Sowerbyella are recognized in the present paper: S. radiculata (Sow.) Nannf., S. crassisculpturata J.Mor., S. densireticulata J.Mor., S. reguisii (Quél.) J.Mor., S. polaripustulata J.Mor., S. pallida (Spooner) J.Mor., S. imperialis (Peck) Korf, S. brevispora Harm. and S. fagicola J.Mor.
In the opinion of the author, Aleuria rhenana Fuck. is a species closely related to Sowerbyella.
Ascospore ornamentation of the type specimens examined is illustrated by line drawings and SEM photomicrographs.

Zusammenfassung: Der Autor setzt die taxonomische Ueberarbeitung der Gattung Sowerbyella (Ascomycetes, Pezizales) fort, die er in einer früheren Arbeit publiziert hat (J.Moravec 1985a). Aufgrund der Revision der Typusexemplare von Peziza splendens var. reguisii Quél. und Svrcekomyces pallidus Spooner werden die beiden Neukombinationen Sowerbyella reguisii (Quél.) comb.nov. und S. pallida (Spooner) comb. nov. vorgeschlagen. Auch die Typusexemplare von Sowerbyella imperialis

(Peck) Korf und S. brevispora Harmaja wurden untersucht.
In der vorliegenden Arbeit werden neun Sowerbyella-Arten anerkannt: S. radiculata (Sow.) Nannf., S. crassisculpturata J.Mor., S. densireticulata J.Mor., S. reguisii (Quél.) J.Mor., S. polaripustulata J. Mor., S. pallida (Spooner) J.Mor., S. imperialis (Peck) Korf, S. brevispora Harm. und S. fagicola J.Mor.
Nach Ansicht des Autors ist Aleuria rhenana Fuck. sehr nahe verwandt mit Sowerbyella.
Die Ornamentation der Ascosporen der Typusexemplare wird sowohl durch Strichzeichnungen als auch durch elektronenoptische Aufnahmen illustriert.

Résumé: Cet article constitue une suite de la révision du genre Sowerbyella, dont une première partie a été publiée dans un premier travail de l'auteur (J.Moravec 1985a). Se basant sur la révision des exemplaires-types de Peziza splendens var. reguisii Quél. et de Svrcekomyces pallidus Spooner, les nouvelles combinaisons Sowerbyella reguisii (Quél.) comb.nov. et S. pallida (Spooner) comb.nov. sont proposées. Les exemplaires-types de Sowerbyella imperialis (Peck) Korf et de S. brevispora Harmaja ont été étudiés.
Neuf espèces de Sowerbyella sont ici reconnues par l'auteur: S. radiculata (Sow.) Nannf., S. crassisculpturata J.Mor., S. densireticulata J.Mor., S. reguisii (Quél.) J.Mor., S. polaripustulata J.Mor., S. pallida (Spooner) J.Mor., S. imperialis (Peck) Korf, S. brevispora Harm. et S. fagicola J.Mor.
Selon l'avis de l'auteur, Aleuria rhenana Fuck. est une espèce apparentée de très près au genre Sowerbyella.
L'ornementation des ascospores des exemplaires-types est illustrée à la fois par des dessins au trait et par des photographies au microscope électronique.

INTRODUCTION

In an earlier paper (J.Moravec, 1985a) three new species of the genus Sowerbyella Nannf.(Ascomycetes, Pezizales), S. crassisculpturata, S. polaripustulata and S. densireticulata were described on the basis of differences in ascospore ornamentation. After the revision of the type of S. radiculata from K herbarium and other specimens from various herbaria it has been confirmed that Sowerbyella is a large genus. The species differ especially in ascospore size and ornamentation.

Only a few species differ macroscopically. Seven species of the genus were recognized in the previous paper. On the other hand, it was confirmed that S. bauerana (Cooke) Harm. is a later synonym of S. radiculata. In the present paper I am publishing the results of my examination of other specimens of Discomycetes belonging to Sowerbyella which were deposited in various herbaria under different generic names. Nine species are now recognized.

MATERIAL AND METHODS

In addition to the specimens published in the previous paper (J.Moravec 1985a) other specimens were examined from the following herbaria: Muséum National D'Histoire Naturelle, Paris (PC); Royal Botanic Gardens, Kew (K); New York State Museum, Albany (NYS); Botanical Museum, Helsinki (H); National Museum, Prague (PRM); Hungarian Natural History Museum, Budapest.
Studies on ascospore ornamentation were made on dried material revived in 4% aqueous NH_4OH. Sections were stained in Cotton Blue Geigy s 123 in lactic acid (CB) and the ascospores observed and measured with an oil immersion objective at a magnification of x 1600. The perisporial ornamentation of ascospores was studied in greater detail and the variability compared. A scanning electron microscope, Tesla BS 300, was used and micrographs (SEM) were taken from dried material.

TAXONOMIC RESULTS

The following type specimens and collections were examined and revised:

Peziza splendens var. reguisii Quél.
Originally collected by Dr. Reguis near Marseille "sur l'humus de bois de pins" and described by Quélet (1887). For the redescription and illustration (after Boudier's aquarelle) of macrofeatures of apothecia see also Heim (1961) who reexamined the type and transferred this taxon to the genus Peziza (sensu Boudier) as P. reguisii (Quél.) Heim.
I have found that this fungus has all features of Sowerbyella, especially the stipitate apothecia with yellow-olivaceous thecium, excipular structure and ascospore ornamentation. I propose a new combination:
Sowerbyella reguisii (Quél.) J.Moravec comb.nov.

Basionym: Peziza splendens var. reguisii Quélet, 15e Supplément aux champignons du Jura et des Vosges 1886, C.R. Ass. franç. Av. Sci, Nancy, 15: 490, Pl.9/14 (1887).
The ascospores of the type measure (17)-18-21-(22.5) x (8)-9-9.7-(10.2) µm. The perisporial ornamentation consists of a complete or incomplete reticulum. The ridges of the reticulum are 0.3-1.2 µm wide and 0.2-0.8-(1.2) µm high. Occasionally, isolated warts are distributed among the ridges. The perisporium of a certain number of ascospores resembles that found in S. densireticulata but meshes of the reticulum in S. reguisii are much wider and the reticulum is almost complete in many ascospores and clearly observable even without oil immersion objective. The reticulum in ascospores of S. densireticulata is much finer, denser and irregular, only recognizable under the oil immersion objective. Moreover, the ascospores of S. reguisii are slightly longer. Compare the SEM figs.6-7 and SEM of S. densireticulata (J.Moravec 1985a, figs. 16-17). The paraphyses are straight or only slightly curved above, while the apices of the paraphyses in S. densireticulata are conspicuously hook-like. Sowerbyella reguisii differs from the type species of the genus, S. radiculata, mainly by much larger ascospores, different form of the meshes of the perisporial reticulum, and in the macrofeatures. A certain number of ascospores of S. reguisii have an almost complete reticulum similar to that in ascospores of Aleuria rhenana (see the SEM of ascospores of A.rhenana in J.Moravec 1985b). Also other features, especially the stipitate apothecia, the excipular structure and the paraphyses show a relationship between Aleuria rhenana and Sowerbyella. In my opinion, A.rhenana is a fungus very close to the generic concept of Sowerbyella. It differs merely by the more orange colour of the thecium and slightly by the strictly hyaline, thin-walled hyphae of the outer surface of apothecia.

Svrcekomyces pallidus Spooner
Described by Spooner (1981) from the soil amongst hepatics under Alnus, Hodders Combe, Quantocks, Somerset, Great Britain, (K). A detailed description and illustration is provided by Spooner (1981). I have examined a part of the type specimen (K). The ascospore ornamentation structure and shape of apothecia and habitat clearly show that this fungus belongs to the genus Sowerbyella.
Svrcekomyces J.Mor. (1976) was proposed for Pseudombrophila guldeniae

Svr., as the earlier described Nannfeldtiella Eckblad was described with ascospore sculpture of non callose-pectic nature, and the ascospores of the type species N. aggregata were described and illustrated with a very different sculpture (Eckblad 1968). The ascospore ornamentation of Pseudombrophila guldeniae was found strongly cyanophilic of callose-pectic nature and thus different from Eckblad's description of Nannfeldtiella. Following examination of one collection (Norway, Akershus, Nannestad, leg. S.Sivertsen et Gro Gulden, det. F.E.Eckblad, NY) of N. aggregata and my reexamination of the type of P. guldeniae (unpublished results), I have found that N. aggregata is identical with P. guldeniae and thus Svrcekomyces is a later synonym of Nannfeldtiella. Recently Svrček (1981) transferred P. guldeniae to the genus Nannfeldtiella. However, Nannfeldtiella differs from Sowerbyella by the violaceous pigments of the thecium, tetrasporic asci and thin paraphyses. The ascospores (especially when immature) stain violaceous in lactic acid + CB. The mentioned features differentiate Nannfeldtiella from Sowerbyella though the excipular structure and external apothecial hairs are very similar in both genera.

Svrcekomyces pallidus clearly differs from the generic concept of Nannfeldtiella and for the features mentioned above I propose the new combination:

Sowerbyella pallida (Spooner) J.Moravec comb.nov.

Basionym: Svrcekomyces pallidus Spooner, Trans. Brit. Mycol. Soc. 76: 298 (1981).

The perisporial ornamentation of S. pallida is of the same nature and origin as in other species of Sowerbyella. Immature ascospores of S. pallida as well as immature ascospores of other species examined have the perisporium covered with large pustules of cyanophilic pigment. Mature ascospores are ellipsoid to ellipso-fusoid, (17.2)-18.2-21.7-(23) x 7.5-9.8-(10.2) µm [excl. ornamentation], the perisporium covered with strongly cyanophilic irregular warts, spine-like ridges and spines, 0.3-1.5-(2) um wide and 0.4-1.5 um high, conspicuously enlarged at the poles (up to 2.8 um wide and 2 um high) [figs. 2,8,9,10]. The ornamentation is very similar to that in S. polaripustulata (see J. Moravec, 1985a, figs. 3,12-15) which clearly differs by smaller ascospores, much larger, cupulate, conspicuously stipitate apothecia with a longer root-like base and yellow-ochraceous hymenium. Apothecia of S. pallida are subsessile, white or whitish to dirty

white with brownish patches on drying (see Spooner 1981).

Sowerbyella imperialis (Peck) Korf

On the basis of the type examination, Korf (1971) transferred this fungus, described as Peziza (Sarcoscypha) imperialis Peck (1978), to Sowerbyella and considered it identical with the later described S. unicolor (Gill.) Nannf. This opinion was confirmed by Pfister (1979). The holotype (NYS) is fully identical with the European fungus, known under the later synonym S. unicolor. The ascospores of the type measure 13.5-15-(16.5) x (5.5)-6.5-7-(7.5) µm and agree well with the ascospore size of the type collection (Pontarlier, leg. Boyer, of Aleuria unicolor Gill. [1879]) which was examined by Heim (1981). Ascospore ornamentation (fig. 5) consists of fine, rarely isolated but more often anastomosing warts forming an incomplete delicate reticulum as illustrated by Le Gal (1947), Breitenbach & Kränzlin (1981), and J. Moravec (1985a). The ascospores are the same as in European collections of S. unicolor. When only 2-6 mature ascospores are developed in an ascus, the size may be larger (up to 16.5 µm). Krieglsteiner (1978) reported this species from Western Germany (BRD) , as S. unicolor. He suspected one collection (Treuchtlingen/Bayern, leg. R.Wilke) to be S. fagicola J.Mor., however, I have examined this collection (J.Moravec 1985a, figs. 5 and 18-19), and find the typical ascospore size of S. imperialis. Sowerbyella fagicola has much larger ascospores (J.Moravec 1973, 1985a, figs. 6 and 20). I have not examined the second collection suspected to be S. fagicola which was reported from "Fränkischer Jura, Altmühltal" by Krieglsteiner (1978).

I have examined the specimen of Geopyxis cupularis sensu Velenovský (1934) which was determined as S. unicolor by Svrček (1981). The ascospore size and ornamentation are the same as in the type of S. imperialis.

Sowerbyella brevispora Harmaja

I have examined a part of the holotype (H) of the species described recently by Harmaja (1984) from Finland. The ascospores are ellipsoid and measure 9-11.2-12 x 5.7-6.6 µm and have a perisporium with fine warts, 0.1-0.3 µm diam. and 0.1-0.4 µm high. The warts are isolated or only very rarely connected (figs. 3,11). Hairs of the outer surface of apothecia are up to 8 µm wide with walls 0.2-1.2 µm thick. In my opinion, this species is closely related to S. imperialis but clearly differs by the ascospore size, the isolated sculpture of the perisporium

and by the thick walls of apothecial hairs.
I have examined two further collections and determined them as S. brevispora: (1.) Hungaria, prope pag. Czévharaszt, ad terram in ramulis putridis in Robinieto, 21.VII.1963 leg. Dr.J.Bánhegyi, det. Dr.S. Tóth et Dr.J.Bánhegyi as Sarcoscypha kecskemetiensis Hollós. I have found the ascospores of the same size and ornamentation as the ascospores of the type (figs.4,12,13). Immature ascospores (i) have a perisporium covered with large pustules of cyanophilic pigment.
(2.) Czechoslovakia, Bohemia centralis, Prague, "Kinskéno sady", sub foliis dejectis, Acer, Quercus, 17.V.1961 leg. Dr.E.Wichanský (PRM 616869), deposited under the name "Discina radiculata". The features of this collection also agree with the type. In my opinion, S. brevispora has sufficient characters for specific delimination. The hyaline apothecial hairs of the two collections are thick-walled, similar to those of the type, and this feature is constant for the species. However, although hyaline apothecial hairs of S. imperialis have usually thin walls, brownish hairs with thicker walls occasionally occur in the ectal layer of the excipulum of S. imperialis. The structure of the ectal layer of the excipulum in all species of Sowerbyella deserves further study and it may help for a better understanding of the systematic position of this genus.

Sarcoscypha kecskemétiensis Hollós (1899) which was considered identical with S. radiculata by Svrček (1981), remains an unknown species. Dr.J.Gönczöl (Hung. Nat. Museum, Budapest) informs me that the type specimen does not exist as part of the Holós' herbarium was destroyed.
In my opinion, S. imperialis sensu Kullman (1985) may be conspecific with S. brevispora. The isolated warts of ascospores according to the SEM fig.3 in Kullman (1985) support this opinion. Also the ascospores, (according to Kullman's description) are only slightly longer, but I have not examined the Estonian collection.
A collection from India which I consider an undescribed species of Sowerbyella (India, Batasi, Darjeeling, 6.IX.1979, leg. Rishi Kaushal) was sent to me by the collector, determined as Otidea sp. It has ascospores with an ornamentation which differentiates this species from all other species treated in this paper.
As for the shape of apothecia within the genus, the occasionally split-down apothecia do not represent a valuable feature.

In addition, I have examined the holotype of Peziza pateraeformis Dur. & Lev. which was considered a possible synonym of S. radiculata by Nannfeldt (1938) , though this fungus was transferred to Pustularia Fuck. by Boudier (1907). I can confirm that this fungus is a species of the genus Tarzetta (Cooke) Lamb. (=Pustularia Fuck.) and is very close to or even identical with T. catinus (Holmsk.) Korf & J.K.Rogers sensu Boudier (1905-1910). (=T. cupularis [L. ex Fr.] Lamb. sensu Dennis, 1978).

It is clear that individual collections of many species of Sowerbyella are not confined to a specific substrate. They occur in both coniferous woods and deciduous forests and their ecology is not a valuable feature for specific delimination. On the other hand, a majority of species occur in September to November, although S. imperialis and two related species S. brevispora and S. fagicola have earlier fruiting time. Also S. densireticulata occurs in summer, except at higher altitude.

A KEY TO THE NINE SPECIES OF SOWERBYELLA

1 Ascospores ellipsoid, perisporium with a coarse or fine reticulate ornamentation of with a subreticulate to isolately warted sculpture. Paraphyses straight to curved and only slightly enlarged above.....2

1* Ascospores ellipsoid or ellipso-fusoid; perisporium with coarse warts, ridges or spines usually conspicuously enlarged at the ascospore poles, never forming a reticulum. Paraphyses straight or slightly curved and only slightly enlarged above.....5

1** Ascospores ellipsoid or ellipso-fusoid; perisporium with fine, isolated or anastomosing warts. Paraphyses straight, conspicuously enlarged above.....6

2 Apothecia stipitate with a conspicuous root-like base, thecium yellow-ochraceous, outer surface pale ochraceous to whitish.....3

2* Apothecia subsessile to stipitate, base not so conspicuous.....4

3 Ascospores 12-16.5 x 6-8.2 um, the reticulum complete to incomplete, ridges 0.4-0.7-(1.2) um wide and 0.2-0.5-(0.7) um high..... S. radiculata (Sow.). Nannf.

3* Ascospores 13.5-15-(16.5) x 7.5-9.7-(10.5) um, subreticulate to warted; warts usually isolated, course, 0.3-1.5-2.5 um wide and 0.5-1.2-1.6 um high..... S. crassisculpturata J.Mor.

4 Thecium yellow to egg-yellow, externally pale yellowish. Ascospores 14-19.5 x 6.7-8.3-9 um, irregularly incompletely reticulate; the ridges 0.15-0.2-0.6 um wide and 0.1-0.45 um high, fine and extremely densely arranged. Paraphyses conspicuously hook-like at apex..... S. densireticulata J.Mor.

4* Thecium yellow-olivaceous, externally jonquilleous, base of the stipe covered with a white hyphostroma. Ascospores (17)-18-21-(22.5) x (8)-9-9.7-(10.2) µm, the reticulum of the perisporium almost regular and complete with much larger meshes, or very incomplete. Paraphyses straight.... ..... S. reguisii (Quél.) J.Mor.

5 Apothecia stipitate, similar to S. radiculata, thecium yellow-ochraceous to egg-yellow, externally paler. Ascospores ellipsoid, 13-15-(16.3) x 6-7.5 um, the warts, spine-like ridges and spines are 0.2-2.5 um wide and 0.6-1.6-(2) um high, often conspicuously enlarged and connected at the ascospore poles (pustules up to 3 um diam.)..... ..... S. polaripustulata J.Mor.

5* Apothecia shortly stipitate, whitish, thecium whitish with brownish spots. Ascospores ellipso-fusoid, (17.2)-18.2-21.7-(23) x (7.5)-9-9.8-(10.2) µm; the warts, spine-like ridges and spines are 0.3-1.5-(2) um wide and 0.4-1.5 µm high, enlarged at the ascospore poles to 2.8 µm wide and up to 2 um high..... ..... S. pallida (Spooner) J.Mor.

6 Apothecia stipitate, thecium fulvous, bright yellow-orange, externally yellow to bright yellow.....7

6* Apothecia stipitate, thecium bright yellow-orange, near the margin with a reddish tinge, externally pale yellow-ochraceous; stipe long, wide, often with alveoles or blunt ribs. Ascospores ellipso-fusoid, (15)-16-19.5-20.5-(21.5) x 7-8 µm; warts of the perisporium fine, often anastomosing, 0.3-0.7 um diam. and 0.2-0.4-(0.6) µm high, occasionally forming a very incomplete reticulum..... S. fagicola J.Mor.

7 Ascospores ellipsoid, 13.5-15-(16.5) x (5.5)-6.5-7-(7.5) µm; perisporium ornamented with fine warts 0.2-0.6 µm diam. and 0.1-0.7 µm high, usually anostomosing and forming an incomplete reticulum..... S. imperialis (Peck) Korf

7* Ascospores ellipsoid, 9-12.2 x (4.4)-5.7-6.6 µm, perisporium with very fine almost isolated warts. The warts measure 0.1-0.3 µm in diam. and are 0.1-0.4 um high..... ..... S. brevispora Harmaja

Note: All the measures of ascospores in this key are given without the ornamentation of the perisporium.
The macrofeatures deserve further study on fresh material.

ACKNOWLEDGEMENTS

I thank Dr. R. Cailleux (Paris), Dr. J. Gönczöl (Budapest), Dr. J. Haines (Albany), Dr. H. Harmaja (Helsinki), Dr. B.M. Spooner (Kew) and Dr. Z. Pouzar (Prague) for their essential help in sending me the type or other material. I am most grateful to Mr. Jiří Lhotecký (Brno) who performed the SEM photography of ascospores in the University of Agriculture, Brno.

REFERENCES

Boudier, E., 1905-1910: Icones mycologicae ou iconographie des champignons de France. Paris.

Boudier, E., 1907: Histoire et classification des Discomycètes d'Europe. Paris.

Breitenbach, J., et F. Kränzlin, 1981: Champignons de Suisse. Tome 1. Lucerne.

Dennis, R.W.G., 1978: British Ascomycetes. Vaduz.

Eckblad, F.E., 1968: The genera of the Operculate Discomycetes. A re-evaluation of their taxonomy, phylogeny and nomenclature. Nytt. Mag. Bot. 15: 1.191.

Gillet, C.C., 1879: Les champignons de France. Discomycètes. Livr.2.: 29-56. Alençon.

Harmaja, H., 1984: Sowerbyella brevispora, a new discomycete species from Finland. Karstenia 24: 29-30.

Hollós, L., 1899: Ujadok Magyarország gombáinak ismeretéhez (Különlenyomat a Keczkeméti All Föreáliskola 1 96-1899, Evi Ertesitöjébäl Keczkemet.

Korf, R.P., 1971: Some new Discomycete names. Phytologia 21: 201-207.

Krieglsteiner, G.J., 1979: Über einige Neufunde von Asco- und Basidiomycetes in der Bundesrepublik Deutschland. Z. Mykol. 45 (1):35-44.

Kullman, B., 1985: Sowerbyella imperialis (Peck) Korf in Estonia. Mycotaxon 22: 265-268.

Le Gal, M., 1947: Recherches sur les ornamentations sporales des Discomycètes operculés. Ann. Sci. Nat. Bot., sér. 11, 8: 73-297.

Moravec, J., 1973: Sowerbyella fagicola J.Moravec spec.nov., nový druh z Československa. Čes. Mykol. 27: 65-68.

Moravec, J., 1976: Svrcekomyces J.Moravec gen.nov., a new genus of Pyronemaceae Corda em. Eckblad (Discomycetes). Čes. Mykol. 30:5-7.

Moravec, J., 1985a: A Taxonomic revision of the genus Sowerbyella Nannfeldt (Discomycetes, Pezizales). Mycotaxon 23: 483-496.

Moravec, J., 1985b: Nové nálezy hub v Československu. Czechoslovak records. 26. Aleuria rhenana Fuckel, Čes. Mykol. 39: 165-168, Tab. XX-XXI.

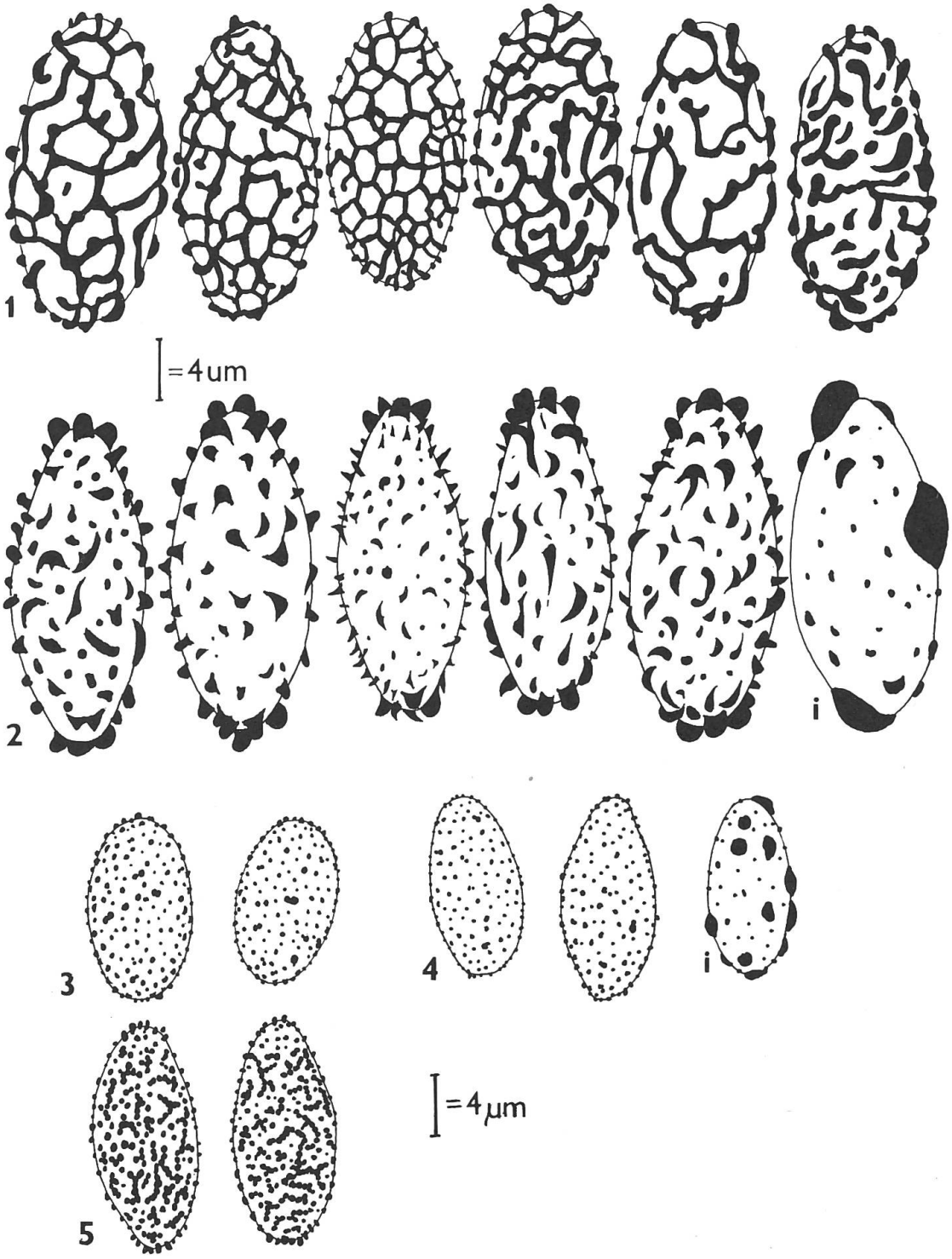
Nannfeldt, J.A., 1938: Contribution to the mycoflora of Sweden 5. On Peziza catinus Holmskj. ex Fr. and P. radiculata Sow. ex Fr. with a discussion of the genera Pustularia Fuck. emend Boud. and Sowerbyella Nannf. gen. n. Svensk Bot. Tidskr. 32: 108-120.

Peck, C.H., 1878: Report of the Botanist. Ann. Rept. New York State Mus. 29: 29-82, 2 pl.

Quélet, L., 1887: Quelques espèces critiques ou nouvelles de la flore mycologique de France.- 15^{e} Supplément aux champignons du Jura et des Vosges, 1886, C.R. Ass. franç. Av. Sci, Nancy, 15: 486-490, Pl. 9.

Svrček, M., 1981: Katalog operkulátních diskomycetů (Pezizales) ČeskoslovenskaII. (O-W). Čes. Mykol. 35: 64-89.

Velenovský, J., 1934: Monographia Discomycetum Bohemiae. 1-2. Pragae.



Figs. 1-5. Ascospores under oil immersion, 1600+CB: 1. Sowerbyella reguisii (holotype, PC). 2. S.pallida (holotype, K). 3. S.brevispora (holotype, H). 4. S. brevispora (Hungaria, Czévharaszt). 5. S. imperialis (holotype, NYS). i = immature ascospores

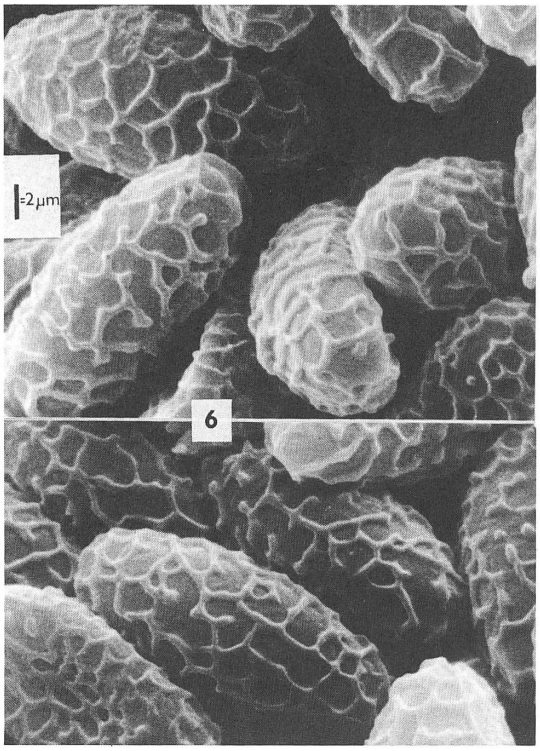


Fig. 6. SEM of ascospores of the holotype of Sowerbyella reguisii.

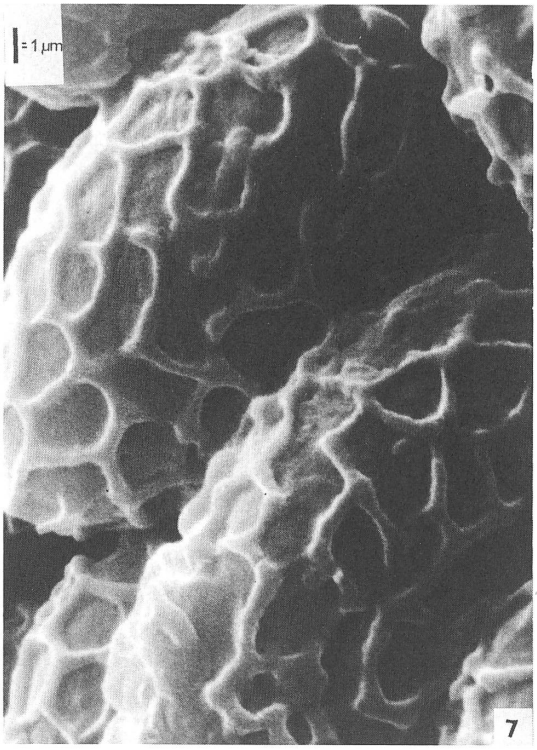
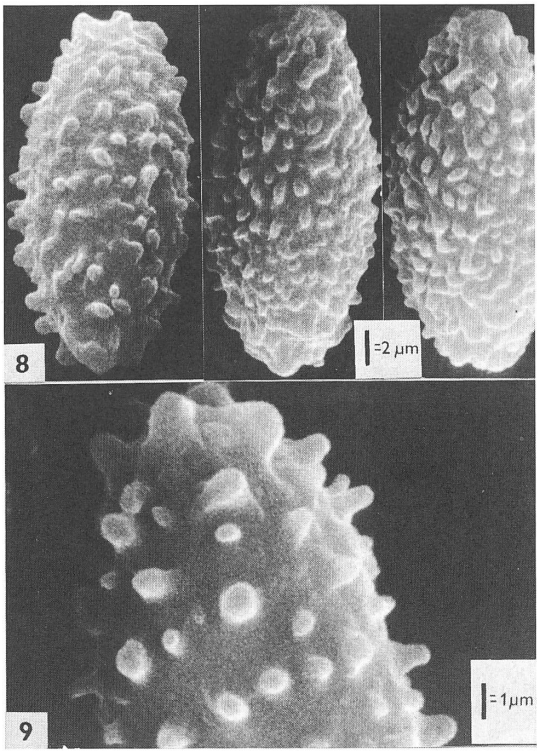


Fig. 7. SEM of ascospores of the holotype of Sowerbyella reguisii.



Figs. 8-9. SEM of ascospores of the holotype of Sowerbyella pallida.

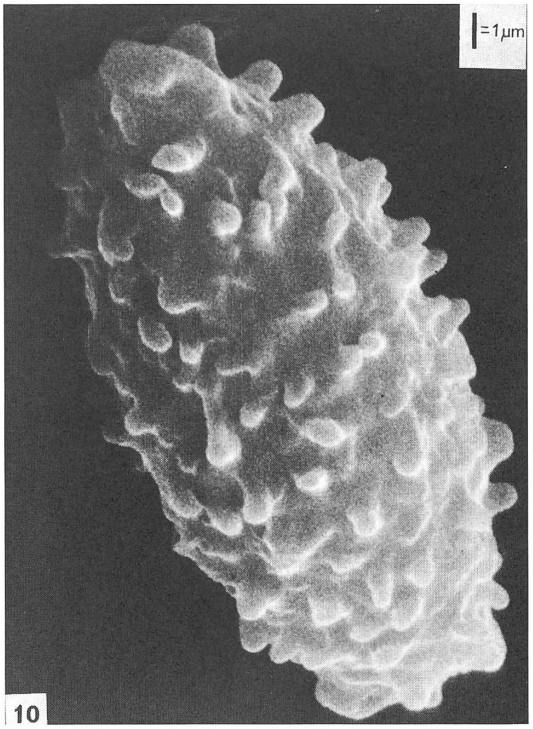


Fig. 10. SEM of ascospores of the holotype of Sowerbyella pallida.

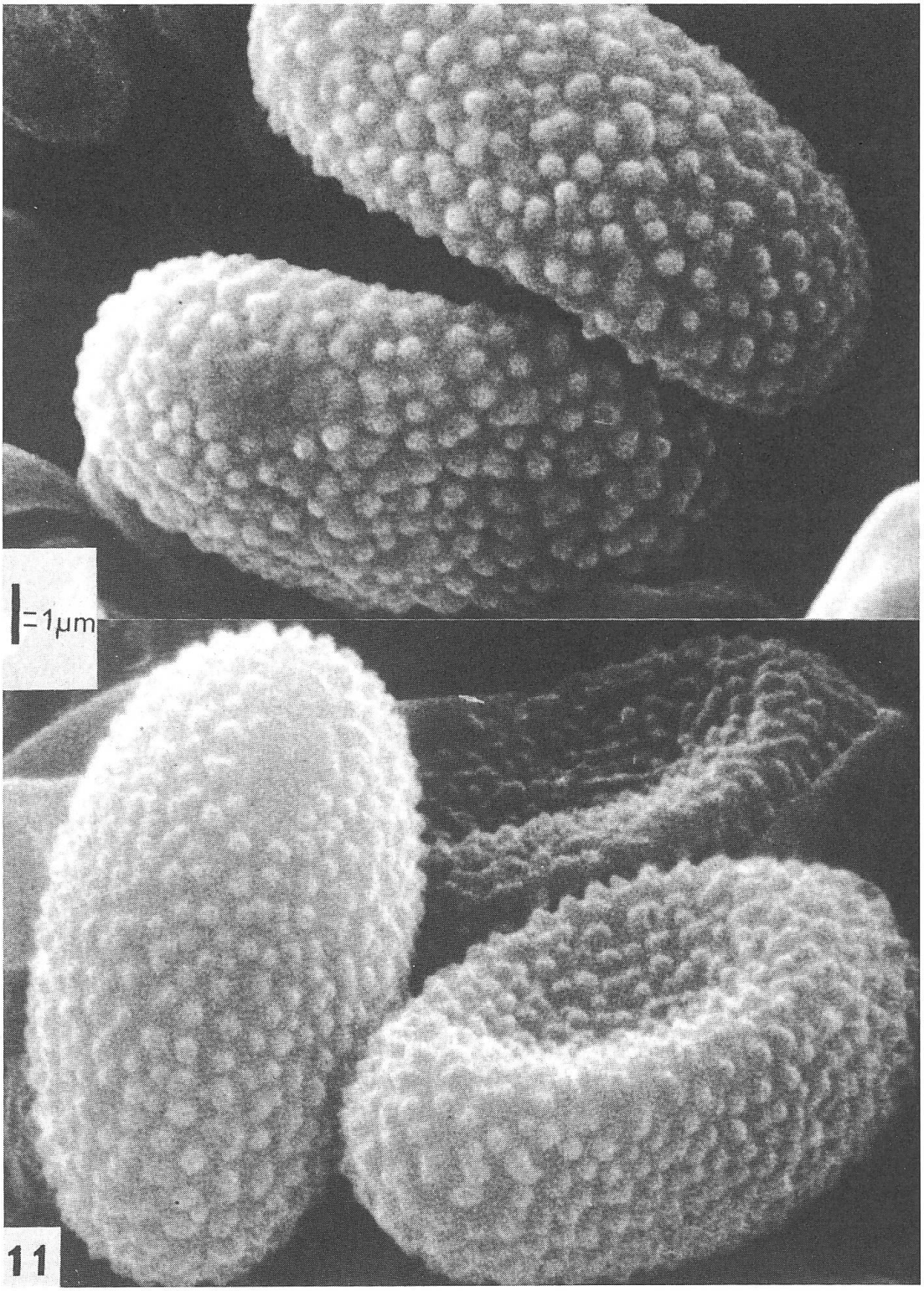
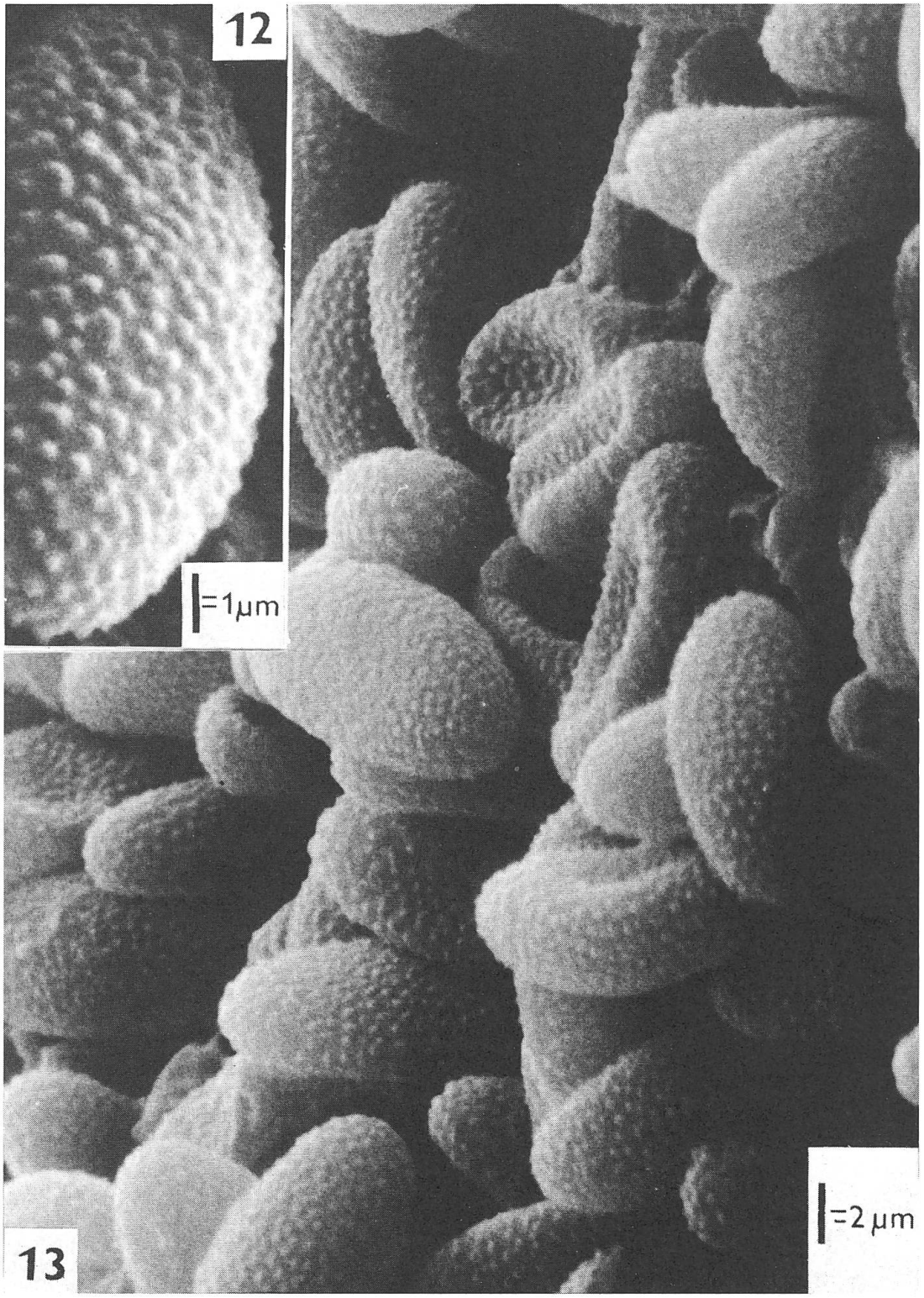


Fig. 11. SEM of ascospores of the holotype of Sowerbyella brevispora.



Figs. 12-13. SEM of ascospores of Sowerbyella brevispora (specimen from Hungary, Czévharaszt).