Notes on scutellinioid fungi in collections of the Vienna University herbarium (WU)

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Abstract: Four species of *Pyronemataceae* from eight Austrian collections of the Vienna University herbarium (WU) are described and illustrated. These are *Scutellinia cejpii*, *S. barlae*, *S. sinensis*, and *Spooneromyces laeticolor.*

Résumé : Quatre espèces de *Pyronemataceae* de huit collections Autrichiennes de l'herbier de l'université de Vienne (WU) sont décrites et illustrées. Il s'agit de *Scutellinia cejpii*, *S. barlae*, *S. sinensis* et *Spooneromyces laeticolor.*

Zusammenfassung: Vier Arten der *Pyrenomataceae* von acht österreichischen Kollektionen aus dem Herbarium der Universität Wien (WU) werden beschrieben und illustriert. Diese sind *Scutellinia cejpii*, *S. barlae*, *S. sinensis* und *Spooneromyces laeticolor.*

Through two ongoing studies with NEVEN MATOČEC (Ruđer Bošković Institute, Zagreb) on some species of the genus *Scutellinia* (unpubl.), we agreed to share the result of our work on some herbarium revisions. So, I studied several collections of the herbarium of the University of Vienna (WU, Austria). The term "scutellinioid fungi" is used to designate operculate discomycetes belonging to the genus *Scutellinia* (COOKE) LAMBOTTE or to related genera, like *Spooneromyces* T. SCHUMACH. & J. MORAVEC. The main features of this group are: ascus apex inamyloid, not exceeding the surface of the hymenium, apothecia generally small, with a hairy margin, every hair being individualised, usually with acuminate apex.

Material and methods

Study of collections was made in a safe place to prevent accidental loss of material by jumping away. A very tiny free-hand section of an apothecium was taken with a razor blade, rehydrated in bidistilled water, rinsed, and mounted in Cotton Blue (CB). Before examination, the CB was heated to boiling point, the section rinsed, cut into parts and mounted in chloral hydrate. Another part of the section was observed in chloral hydrate without CB staining.

The microscopic study was conducted with an optical microscope. The microscopic photographs were taken using a Nikon D50 mounting ring for Leica Apo Televid, microscope ocular removed. Drawings were handmade, with tracing paper from photos retouched with Adobe Photoshop. The spore dimensions were calculated from photographs using the software Mesurim Pro. The software was set to scale photographs of a scale slice under the conditions mentioned above. At least 25 spores,

which were released or within asci but seemingly ripe, were measured.

The following abbreviations are used in the text: *TV* top view, *SWV* spore wall view, *bw* base width, *h* height, *Q* ratio length /width, *X* average.

Descriptions

***Scutellinia cejpii* (VELEN.) SVRČEK,** Česká Mykol. **25**(2): 83 (1971). (Figs. 1, 5 a-b)

Microscopic characters:

Hairs: 210-510 × 20-37 µm, brown to light brown, straight to slightly flexuous, 1-4-septate; thick-walled, wall 5-9 µm, with up to half the width of hairs. Marginal hairs with a bi-, tri- to multi-furcate base, differentiated from receptacular hairs.

Asci: 220-260 × 14-15 µm, octospored, with a pleurorynchous base.

Paraphyses: gradually clavate to the top, enlarged to 7-8 µm above (rehydrated dead state).

Ascospores: (19.6-)20-24.2(-24.7) × 10.4-13.2 µm, X = 21.7 × 11.8 µm, Q = 1.84, narrowly ellipsoidal to fusiform, mostly elongated oval, symmetrical, in asci, to more fusiform and sometimes asymmetric when released, multiguttulate, with many warts of unequal size and very disparate locations; TV: 0.4-1.5(-2) µm in diameter, SWV: 0.5-2 (bw) × 0.2-1.3 (h) µm.

Specimens examined: Austria: Niederösterreich, Pressbaum, Haitzawinkel, Saubichl, 27. 10. 1985, leg. IRMGARD KRISAI-GREILHUBER, as *Scutellinia umbrorum* (WU 27623); - Lilienfeld, Annaberg, Bichleralpe-Hocheck, 30. 7. 1995, leg. IRMGARD KRISAI-GREILHUBER, as *Scutellinia cejpii* (WU 14027). Steiermark, St. Sebastian, Weißenbach, Erlaufsee Süd, 22. 7. 1989, leg. WOLFGANG KLOFAC, as *Cheilymenia rubra*; revision by JIRI MORAVEC (2002) as *Scutellinia cejpii* and *S. crinita* intermixed (WU 8062).

Discussion:

This species may seem complicated to recognize. However, three aspects are important in determination to exclude other species. The first is the size and shape of hairs: they are wide, with a bi-, tri- to multifurcate base, staying short, < 600 µm (pers. obs., SCHUMACHER 1990, BREITENBACH & KRÄNZLIN 1981, MATOČEC & al. 1995). All the revised collections have a maximum hair width of 37 µm but it can also be larger (pers. obs.), up to 50 µm (SCHUMACHER 1990); the wall thickness is also a criterion if it is compared to the width of the hair; the walls can be up to half of the width.

The second aspect is the shape and ornamentation of ascospores: sometimes inequilateral, they are always subfusiform and their ornamentation varies in size and distribution of warts, as enunciated by MATOČEC & al. (1995): "ornament density varies considerably". Similarly, according to SCHUMACHER (1990), "a variable degree of spore sculpturing and a considerable variation in spore size from one apothecium to another ...". I have studied collections with spore length average more than 25 µm. LE GAL (1966) gives the same dimensions, exceeding 30 µm for spores of *Scutellinia hirta* (SCHUMACH.: FR.) KUNTZE, corresponding to *S. cejpii* (see SCHUMACHER 1990). The neotype of *S. hirta* is conspecific with *S. cejpii* (YAO & SPOONER 1996). There is still a debate whether the species must be called *S. hirta*, which would have priority, or *S. ceijpii* (YAO & SPOONER 1996, BOGACHEVA & KULLMAN 2006).

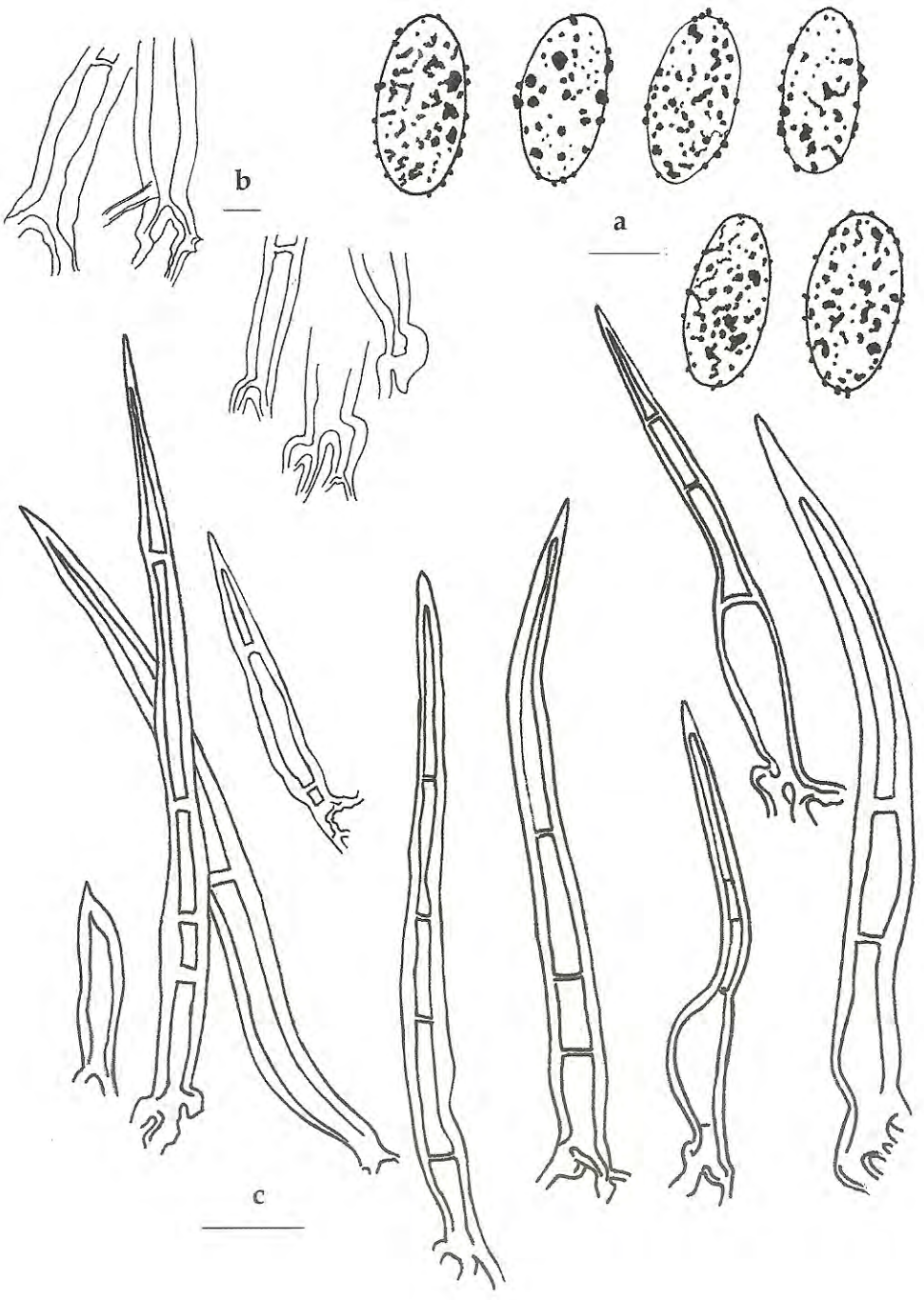

Fig. 1. *Scutellinia cejpii*, WU 8062. *a* spores (bar: 10 µm), *b* base of hairs (bar: 20 µm), *c* hairs (bar: 50 µm).

S. cejpii may be confused with *S. heterosculpturata* KULLMAN & RAITV., but examination of hairs (more elongated and narrower mono-to bifurcate base) removes any ambiguity. In the case of collections with spore length exceeding 25 µm in average, it may be confused with *S. macrospora* (SVRČEK) LE GAL. However, the latter has very low, micro-verrucose spore ornamentation and narrower and more slender hairs.

Finally, I introduce a third aspect concerning the habitat. In France, we find this species on wood, soil or needles, especially under conifers, in colline or montane habitats. In Spain, it occurs in the same type of habitat (leg. RAÙL TENA LAHOZ) and various publications join this aspect like MATOČEC & al. (1995) or BREITENBACH & KRÄNZLIN (1981). SCHUMACHER (1990) extends the habitat to "richer soil types".

Scutellinia barlae **(BOUD.) MAIRE,** Publ. Junta Ciencies Nat. Barcelona, Ser. Bot. **15**(2): 19 (1933). (Figs. 2, 5 c-d)

Microscopic characters:

Marginal and receptacular hairs: not differentiated. Marginal hairs, with a homogeneous length, 250-325 × 16-25 µm, fairly dense at the margin, 1-4-septate, with discrete septa. Hairs medium thick-walled, up to 3.5 µm, representing approximately one third of the width of hairs; a little ventricose, gradually tapering to a monofurcate base. Sometimes, presence of a pubescent margin composed by short, hyphoid or aborted hairs, with rounded or acuminate apex. Receptacular hairs similar but shorter, up to 120 × 12-16 µm.

Asci: 220-320 × 20-27 µm, octospored, with a pleurorynchous base.

Paraphyses: short club-shaped, apically enlarged to c. 10 µm.

Ascospores: perfectly spherical, generally with a large central guttule, Ø 17.1-22.9 µm, X = 19.25 µm; ornamentation giving an aspect of cogwheel, with rounded or truncate warts, spherical at top view, TV: 0.7-2(-2.5) µm in diameter, SWV: 1-1.7 (bw) × 0.4-1.7 (h) µm, X (h): 1.3 µm.

Specimens examined: Austria: Niederösterreich, Puchberg am Schneeberg, Rohrbachgraben Süd-Bürschhof, 27. 9. 1991, leg. ANTON HAUSKNECHT, as *Scutellinia barlae* (WU 9972).

Spain: Andalucia, Jaén, PN Sierra de Cazorla, 12. 4. 1996, leg. HERMANN VOGLMAYR, as *Scutellinia barlae* (WU 19850).

Discussion:

This species can easily be confused with other *Scutellinia* species with rounded spores, However, according to SCHUMACHER (1990), *Scutellinia barlae* has perfectly spherical spores, unlike many collections of *S. hyperborea* T. SCHUMACH., *S. minor* (VELEN.) SVRČEK and *S. legaliae* LOHMEYER & HÄFFNER (pers. obs.). The spore ornamentation is fairly homogeneous in rounded warts in top view and truncated to rounded in spore wall view. Moreover, the hairs are short (about 300 µm) and dense, uniform in length, with a tapering base and mostly unbranched. Some hairs, especially receptacular ones, are shorter, in heaps, and a little ventricose.

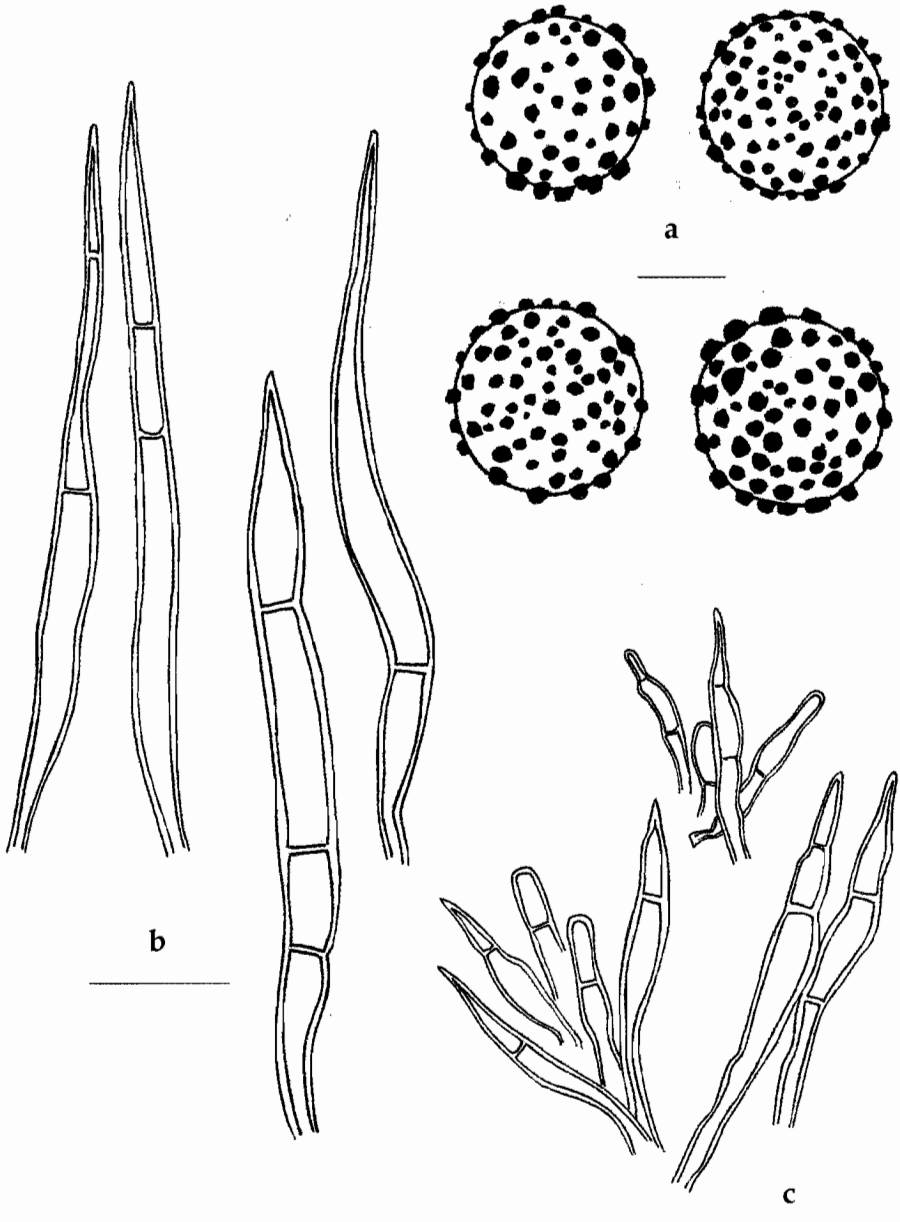

Fig. 2. *Scutellinia barlae*, WU 19850. *a* spores (bar: 10 µm), *b* marginal hairs (bar: 50 µm), *c* receptacular hairs (bar: 20 µm).

***Scutellinia sinensis* M. H. LIU,** in LIU & PENG, Acta Mycol. Sin. **15**(2): 98 (1996). (Figs. 3, 5 e)

Microscopic characters:

Marginal and receptacular hairs: not differentiated; marginal hairs of heterogeneous length, slightly flexuous, 120-550 × 22-43 µm, long and short hairs intermixed, 3-12-septate; medium thick-walled, up to 6 µm, wall thickness between one quarter and one third of the width of hairs; from apex to the bi-, tri- to multi-furcate base gradually expanding.

Asci: 130-200 × 16-25 µm, octospored, with a pleurorynchous and short base.

Paraphyses: apically enlarged, up to 11 µm.

Ascospores: perfectly spherical, generally with a large central guttule, Ø 17.6-19.7 µm, X = 18.5 µm; ornamentation very large hemispherical warts mixed with small ones; TV: 0.5-5 µm in diam. and SWV: 3-5 (bw) × 2-4.5 (h) µm for the large warts.

Specimen examined: Austria: Wien, Liesing, Maurerwald, 15. 7. 1995, leg. WOLFGANG KLOFAC, as *Scutellinia* spec. (WU 13998).

Discussion:

This species was described by LIU & PENG (1996) from a Chinese collection and reported by GLEJDURA (2001) in Slovakia. So, this is the first report for Austria. *Scutellinia sinensis* has perfectly spherical spores, ornamented with very large and hemispherical warts, mixed with smaller ones. This latter character was not illustrated by LIU (in LIU & PENG 1996) in his diagnosis, but GLEJDURA (2001) showed it in both Slovakian collections and in the isotype. In agreement with him, I found it in this Austrian collection.

Scutellinia sinensis differs from *Scutellinia tuberculata* MATOČEC by various criteria, including this special spore ornamentation. It will be discussed in detail in a later study on sphaerosporic *Scutellinia* (unpubl.).

The Austrian collection presents some differences from the Chinese and Slovakian collections: the hairs are a little shorter and narrower, and the spores somewhat larger. However, all dimensions are in the size ranges set by LIU & PENG (1996) and GLEJDURA (2001).

***Spooneromyces laeticolor* (P. KARST.) T. SCHUMACH. & J. MORAVEC,** Nordic J. Bot. **9**(4): 427 (1989). (Figs. 4, 5 f-h)

≡ *Peziza laeticolor* P. KARST., non *P. laeticolor* BERK. & BR.

= *Melastiza asperula* SPOONER, Trans. Brit. Mycol. Soc. **76** (2): 288 (1981).

Microscopic characters:

Ectal excipulum: a textura subangularis, with more elongated cells forming an increased margin.

Medullary excipulum: a textura intricata.

Subhyaline to brownish yellow hairs: emerging from the outermost cells of the ectal excipulum; 100-420 × 14-28 µm, septate, sometimes constricted at septa, medium thick-walled (up to 3 µm), with walls usually visible above the first septum, with an acuminate apex and a simple base.

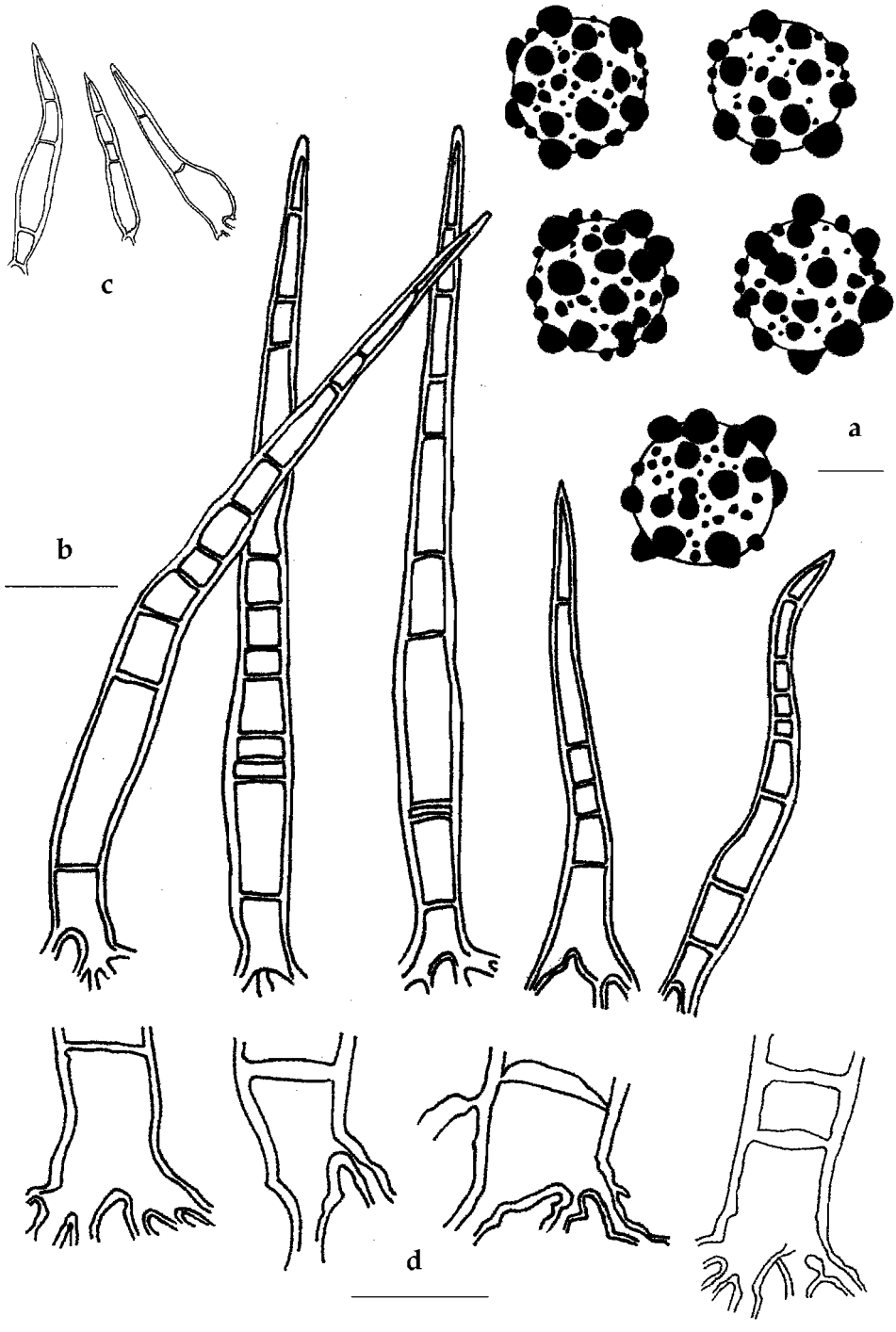

Fig. 3. *Scutellinia sinensis*, WU 13998. *a* spores (bar: 10 µm), *b* marginal hairs (bar: 50 µm), *c* short hairs of pubescent margin, *d* base of hairs (bar: 40 µm).

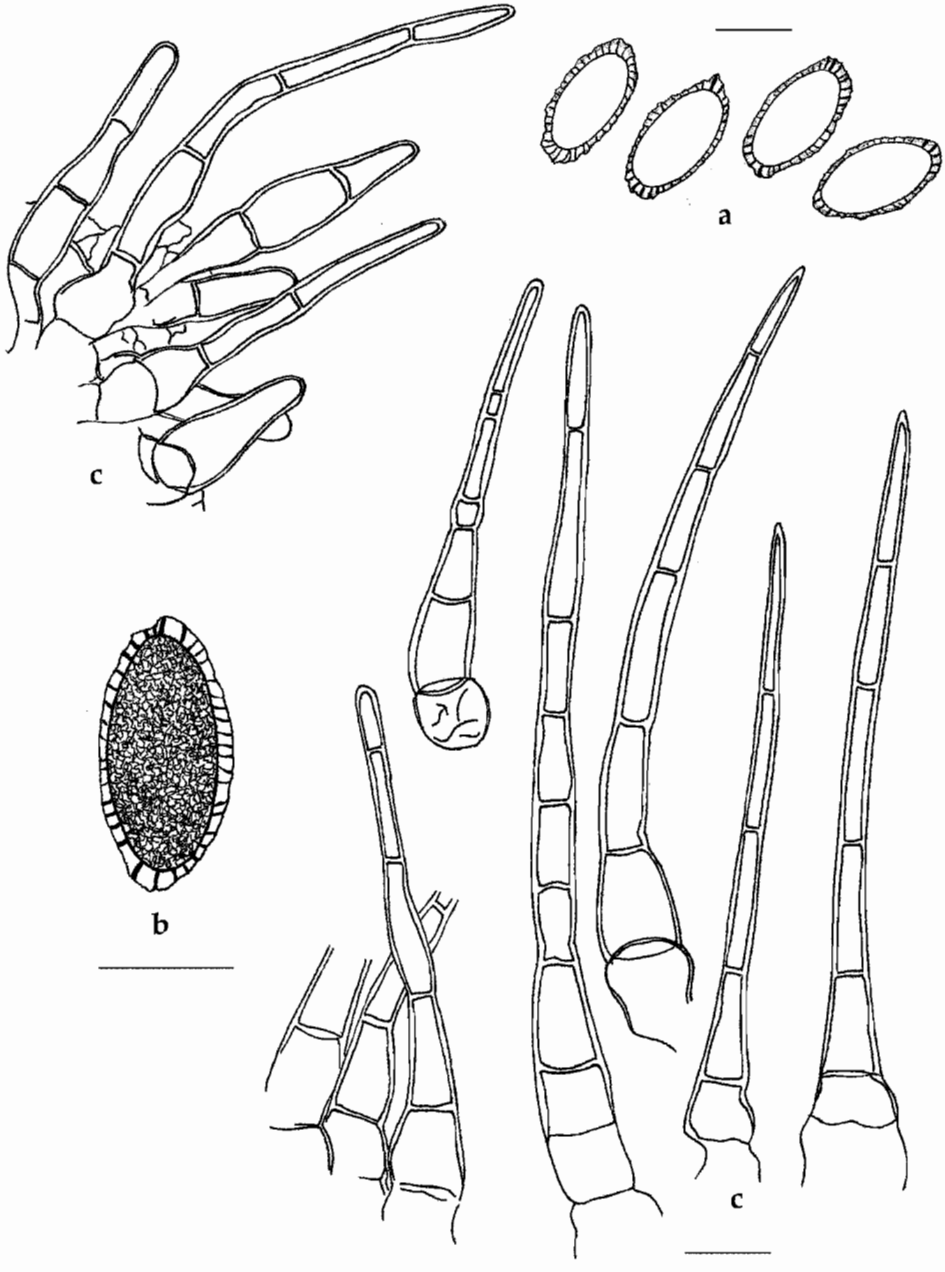

Fig. 4. *Spooneromyces laeticolor*, WU 11450. *a* spores (spore wall view, bar: 10 µm), *b* spore (top view, bar: 10 µm), *c* hairs (bar: 20 µm).

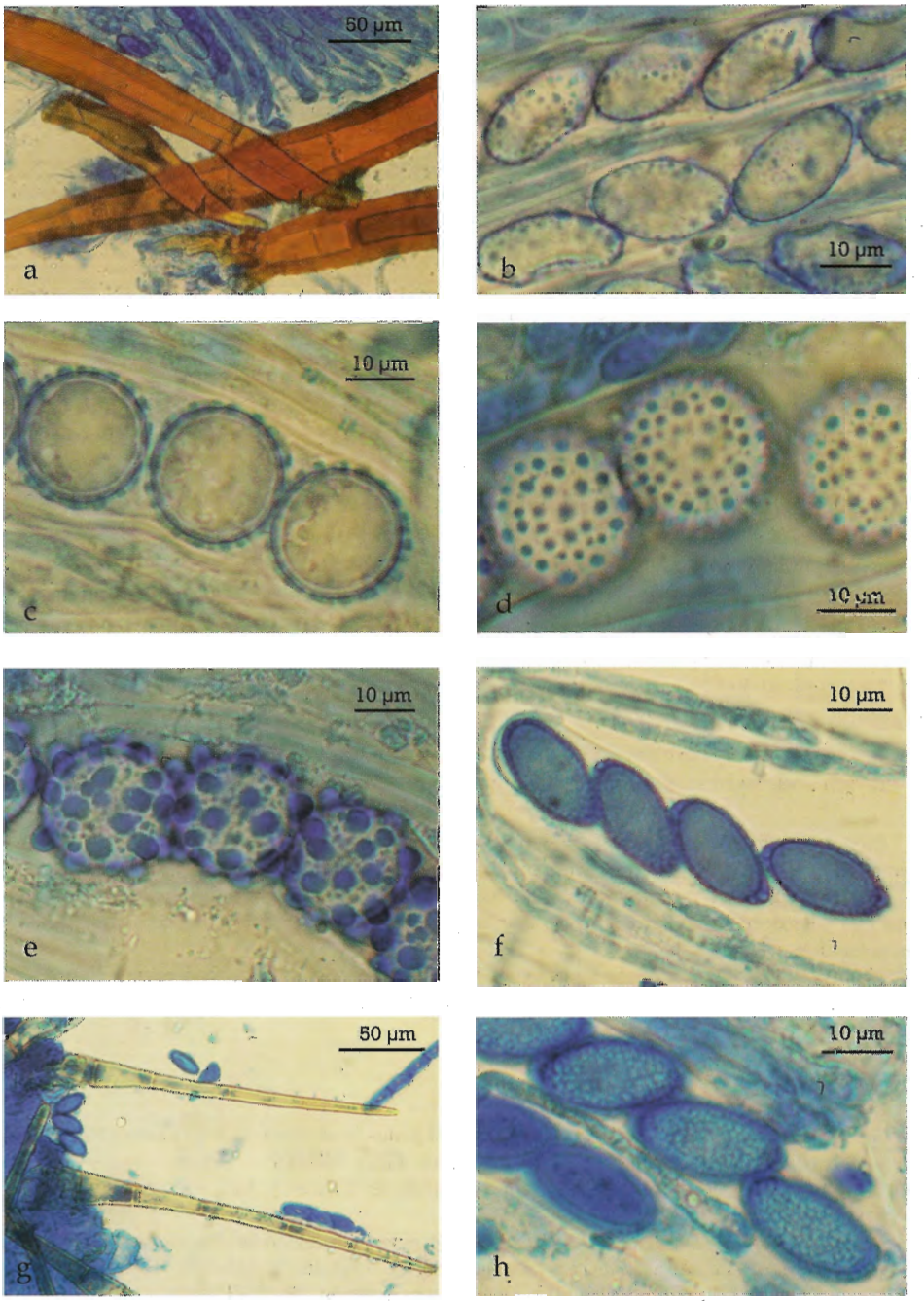

Fig. 5. *a-b. Scutellinia cejpii*, WU 8062. *a* hair walls, *b* spores. *c-d. Scutellinia barlae*, WU 19850. *c* spores (SWV), *d* spores (TV); *e Scutellinia sinensis*, WU 13998, spores (TV). *f-h. Spooneromyces laeticolor*, WU 11450. *f* spores (SWV), *g* hairs, *h* spores (TV).

Asci: 200-260 × 12-14 µm, octospored, with a pleurorynchous base.

Paraphyses: apically clavate, enlarged up to 3 µm.

Ascospores: 17.1-19.3 × 8.2-9.8 µm, X = 18 × 8.8 µm, Q = 2.08, hyaline, biguttulate, ellipsoid to fusiform; ornamentated with micro-warts linked to each other to form a very fine reticulum; at the poles warts and ridges emerging up to 2.5 µm (giving the appearance of a spore envelope).

Specimens examined: Austria: Salzburg, Tamsweg, Prebersee, 27. 8. 1991, leg. WOLFGANG KLOFAC, as *Scutellinia superba* (WU 10469). Steiermark, Pichl-Kainisch, Knoppen, Knoppenmoos, 25. 9. 1992, leg. WOLFGANG KLOFAC, as *Scutellinia convexa* (WU 11450).

Discussion:

The genus *Spooneromyces* was published by SCHUMACHER & MORAVEC (1989) with the type species *Peziza laeticolor* P. KARST. 1870, based on the isotype of KARSTEN, the holotype of *Melastiza asperula* SPOONER and additional material.

The types studied have features close to *Scutellinia* and *Melastiza*, but the hairs are different in appearance and in their origin: out of the outer cells of the excipulum.

The key to this genus provided by MOYNE & al. (2010) leads to *Spooneromyces laeticolor* for both Austrian collections. The salient features are the spores ornamented by microwarts forming a very fine irregular and labyrinthine network. The spore wall is surrounded by an accumulation of material, in particular towards the poles marked with ridges. Hairs are also fairly typical of the genus, mainly located at the margin and thin-walled. Towards the base, two or three thin-walled more globular cells are attached to the surface of the excipulum.

The typical habitat of *Spooneromyces laeticolor* appears to be wood or debris in coniferous forest (SCHUMACHER & MORAVEC 1989, FERNÁNDEZ VICENTE & UNDAGOITIA 2009). The Austrian exsiccata match this habitat: some apothecia are on wood or on rich soil, right in the middle of coniferous needles.

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