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## SCUTELLINIA FUJIANENSIS SP. NOV., A NEW SPECIES FROM CHINA, WITH NOTES ON RELATED SPECIES.

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**ABSTRACT:** A new species of *Scutellinia* is described from China under the name *S. fujianensis* Cao & J.Mor. sp.nov. The new taxon is close to *S. pennsylvanica* (Seaver) Denison and *S. phlyctispora* (Lepr. & Mont.) Le Gal sensu Schumacher (1982). *S. fujianensis* is illustrated by line drawings and SEM of ascospores. Line drawings of *S. phlyctispora* sensu Schumacher (1982) and *S. phymatodeus* S.C.Kaushal & R.Kaushal according to the type material, together with notes on differences, complete the paper. All the related taxa differ especially in ascospore ornamentation.

**ZUSAMMENFASSUNG:** Die Autoren beschreiben eine neue *Scutellinia*-Art aus China: *S. fujianensis* Cao & J.Mor. sp.nov. Sie steht *S. pennsylvanica* (Seaver) Denison und *S. phlyctispora* (Lepr. & Mont.) Le Gal sensu Schumacher (1982) nahe. Strichzeichnungen und SEM-Aufnahmen der Ascosporen illustrieren *S. fujianensis*. Der Beitrag wird vervollständigt durch Strichzeichnungen von *S. phlyctispora* sensu Schumacher (1982) und *S. phymatodeus* S.C.Kaushal & R.Kaushal anhand des Typusmaterials sowie durch Angaben über die Verschiedenheiten. All die verwandten Arten unterscheiden sich besonders durch die Ornamentation ihrer Ascosporen.

**RÉSUMÉ:** Les auteurs décrivent une nouvelle espèce de *Scutellinia* de Chine, *S. fujianensis* Cao & J.Mor. sp.nov. Elle se rapproche de *S. pennsylvanica* (Seaver) Denison et de *S. phlyctispora* (Lepr. & Mont.) Le Gal ss. Schumacher (1982). *S. fujianensis* est illustrée par des dessins au trait et ses ascospores par des photographies au MEB. La contribution est complétée par des dessins au trait et par les données différentielles concernant *S. phlyctispora* ss. Schumacher (1982) et *S. phymatodeus* S.C.Kaushal & R.Kaushal, sur la base des types. Toutes les espèces apparentées se différencient essentiellement par l'ornementation de leurs ascospores.

**Scutellinia fujianensis** Cao & J.Moravec sp.nov.

Apothecia 2-5 mm in diam., sessilia, orbicularia, leniter patellaria dein subexplanata, extus pilis luteo-fuscis, indistinctis, marginem versus longioribus, rigidis obsita, hymenio coccineo rubra, usque aurantiaco-rubra, extus concolora. Pili 130-540(-700)  $\mu\text{m}$  longi et 10-27  $\mu\text{m}$  crassi, rigidi, luteo-fusci, saepe curvati, simplices, acuti, sparse septati, crasse tunicati, (tunica 2.7-4.5  $\mu\text{m}$  crassa), basi radicati. Excipulum externum e cellulis globosis vel subglobosis (textura globulosa), 30-80-105  $\mu\text{m}$  diam. constat. Excipulum parte inferiore (medulla) e hyphis longis, dense intricatis (textura intricata), 5-11(-13)  $\mu\text{m}$  crassis, saepe inflatis, septatis, in hypothecio minoribus, constat. Asci 265-270 x 16.5-18(-19.5)  $\mu\text{m}$ , cylindranei, obtusi, octospori. Ascospores 15-18(-19.5) x 9.7-11(-12)  $\mu\text{m}$ , ellipsoideae, crasse tuberculoso-verrucosae; sculptura sporarum e tuberculis et verrucis irregularibus, crassis, isolatis vel cum costis brevibus, irregularibus, isolatis vel etiam confluentibus, sed ordinatione haud reticulata; tuberculis et costis 1.5-2.5(-3)  $\mu\text{m}$  in diam., in sectione transversali obtusis vel truncatis, saepe elongatis, 2-3.7(-4.5)  $\mu\text{m}$  altis. Paraphyses filiformes, 3  $\mu\text{m}$  crassae, apice ad 5-7.5  $\mu\text{m}$  incrassatae.

Habitat: Solo humido, in silva frondosa, Wuyi Mt., Fujian province, China, 14.VIII.1986 leg. Cao Jin-zhong. Holotypus in herbario MHSU N° 908 et isotypus in herbario BRA et etiam J.Moravecii asservantur.

Apothecia 2-5 mm diam., sessile, rounded, shallowly cupulate to almost discoid, outer surface covered by indistinct brownish hairs, which are longer at the margin of the apothecia; hymenium scarlet to orange-red, outer surface concolorous. Rooting hairs 130-540(-700)  $\mu\text{m}$  long and 10-27  $\mu\text{m}$  broad at their base, yellow-brown, stiff, simple, often curved and with pointed apex, septate (with 1-4 septa), thick-walled, (the walls 2.7-4.5  $\mu\text{m}$  thick), at the base forked and buried deeply among the excipular cells. Ectal excipulum of textura globulosa comprising large globose to subglobose, hyaline cells, 30-80-105  $\mu\text{m}$  diam, elongated towards the margin of the apothecia. Medullary excipulum of textura intricata, comprising densely interwoven, septate, often inflated hyphae 5-11(-13)  $\mu\text{m}$  diam, which grade towards smaller and shorter hyphae in the indistinctly differentiated subhymenium. Towards the margin of the apothecia these medullary hyphae become more densely arranged, septate, obtuse hypha-like hairs, which are protruding and forming a border between the ectal excipulum and the hymenium. Asci 265-270 x 16.5-18(-19.5)  $\mu\text{m}$ , cylindrical, rounded above, 8-spored. Ascospores 15-18(-19.5) x 9.7-11(-12)  $\mu\text{m}$ , usually 16.5 x 10.5  $\mu\text{m}$ ,

ellipsoid, with one or rarely two oil guttules, wall conspicuously ornamented; the cyanophilic ornamentation consists of irregular large tubercles and warts, which are isolated or occasionally connected, forming short irregular ribs, which, however, never form a reticulum. The tubercles, warts and ribs measure 1.5-2.5(-3)  $\mu\text{m}$  in diam. and are 2-3.7(-4.5)  $\mu\text{m}$  high, mostly elongated and rounded or truncate above when observed in optical section. Paraphyses filiform, 3  $\mu\text{m}$  thick, straight, septate, apex enlarged to 5-7.5  $\mu\text{m}$ .

Habitat: On moist soil under broad-leaf trees in a forest, Wuyi Mt., Fujian province, China, 14. VIII. 1986 leg. Cao Jin-zhong. (Holotype MHSU N° 908, isotype BRA and J.Mor.).

The new species is characterised by the scarlet hymenium, short hairs, large globose cells in the ectal excipulum and, especially, by the peculiar ornamentation of the ascospores. This ornamentation can be compared to that in Scutellinia pennsylvanica (Seaver) Denison (1959), a species recently reexamined and fully illustrated by Kullman (1982). However, despite the similar size of the ascospores, the ascospore ornamentation of S. pennsylvanica differs from that of our species. It consists of coarse warts commonly interconnected to form ribs and crests, which form an incomplete to almost complete conspicuous reticulum, as illustrated by line drawings and SEM in Kullman (1982) of the holotype of Melastiza pennsylvanica Seaver. Moreover, the apothecial marginal rooting hairs of S. pennsylvanica are much longer (up to 2300  $\mu\text{m}$ ). Similarly, also Scutellinia scutellata var. macrosculpturata Kulman (1982) differs by longer hairs and different (reticulate) ascospore sculpture.

Scutellinia phlyctispora (Lepr. & Mont.) Le Gal sensu Le Gal (1953) differs by larger ascospores with different ornamentation, which consists of large pustules commonly connected by lower crests (which are missing in our species) and by much longer hairs, as illustrated in Le Gal (1953) fig. 71,73 according to a collection from Madagascar, and probably also in Le Gal (1947) picturing ascospores of a Ciliaria sp. (fig. 7,B).

A closely related species is represented by a collection described and illustrated by Schumacher (1982) from Thailand under the name Scutellinia phlyctispora. However, S. phlyctispora sensu Schumacher (1982) is treated as Scutellinia sp.nov. in Schumacher's recent unpublished monograph of the genus. According to Schumacher (in litt.), the species from Thailand will be formally described as a new taxon. we have learned this fact after the second author of this present paper examined a part of the holotype kindly sent by Dr. Schumacher, and, in return, sent a part of the holotype (isotype) of S. fujianensis

to Dr. Schumacher to be compared with other species in his monograph. Schumacher examined the majority of type specimens of Scutellinia when he prepared his monograph of the genus. Moreover, the recent monograph of Scutellinia, submitted as a Ph.D. thesis at the university Oslo by Dr. Schumacher in 1987 has not been seen by us. The examination of the two collections revealed that S. fujianensis is well differentiated from the Thailand species. The ascospores of Schumacher's new species are broader and the ascospore ornamentation is formed by similar but usually much larger tubercles, which are commonly connected by lower crests, forming an incomplete to almost complete irregular reticulum giving an alveolate appearance of the spore wall. The tubercles are usually 4.5  $\mu\text{m}$  high, often 5.5 or 6  $\mu\text{m}$  in height, giving an irregular outline to the ascospores (see fig. 2). After the examination of the isotype of S. fujianensis, Dr. Schumacher (in litt.) has confirmed our opinion that it is really an undescribed species, which differs from his new taxon from Thailand. Apart from the different ascospore ornamentation, the species from Thailand differs from S. fujianensis by slightly longer and thicker hairs with thicker walls, larger apothecia, thicker paraphyses and smaller cells of the ectal excipulum. However, the main difference is in the ascospore sculpture. The ascospore warts of S. fujianensis are smaller and not or only occasionally connected. They never form a reticulum, the space among the cyanophilic tubercles, warts and short ribs being almost smooth. (fig. 1.a, and figs 4-5 SEM).

Several other species of the genus Scutellinia with coarse ascospore ornamentation, e.g. S. ischnotricha Le Gal (1953) and S. badioberbis (Berk.) Le Gal, differ by lower ascospore warts, larger ascospores, and much longer apothecial marginal rooting hairs. Rifai (1968) considers S. ischnotricha a synonym of S. badioberbis, and, S. phlyctispora sensu Le Gal (1953) probably also identical with S. badioberbis.

Several years ago, the second author examined a collection of a Scutellinia (now a part of the holotype PAN 2430) from India, sent by Dr. S.C. Kaushal, and recommended the Indian mycologist to describe that Scutellinia as a new taxon. Recently, it was published under the name S. phymatodeus S.C.Kaushal & R.Kaushal in S.C.Kaushal, R.Kaushal & Rawla (1983). This Indian species differs by its ascospores, which measure 15-16.5(-18) x 9-13  $\mu\text{m}$  (measured without the sculpture), different ascospore ornamentation (formed by very large, 1-6(-7.5)  $\mu\text{m}$  diam. and 1-3(-4)  $\mu\text{m}$  high, usually almost regularly rounded isolated tubercles (fig. 3)) and by much shorter dark brown marginal rooting hairs, reaching only 140 x 12.5  $\mu\text{m}$ . The hairs are thick walled (walls

2.7-3.3  $\mu\text{m}$  thick), simple or rarely septate, obtuse, subacute to acute above, with a simple or rarely forked (bifurcate) base. ( Isotype BRA and J.Mor.).

We have not examined the type of *S. ahmadi* (Cash) S.C.Kaushal, but according to S.C.Kaushal, R.Kaushal & Rawla (1983), this Indian species is close to *S. phymatodeus* having very short, paler hairs ( only up to 110 x 11  $\mu\text{m}$ ).

*S. fujianensis* and also *S. phymatodeus* and other related species have an outstanding position in the genus. It is difficult to place them within a section of the genus, particularly for the fact that the new recent taxonomy of *Scutellinia* given by Schumacher in his unpublished monograph is not yet known to us.

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We are thankful to Dr. Trond Schumacher (Oslo) for kindly sending to us the part of the type specimen of his new species known under the name *S. phlyctispora* sensu Schumacher (1982), for his reexamination of the type of *S. fujianensis* and his opinion, and for the information about his recent unpublished description of his new taxon based on *S. phlyctispora* sensu Schumacher (1982). Mr. Jiří Lhotecký (Brno) kindly prepared the SEM photomicrographs of ascospores (figs. 4-5).

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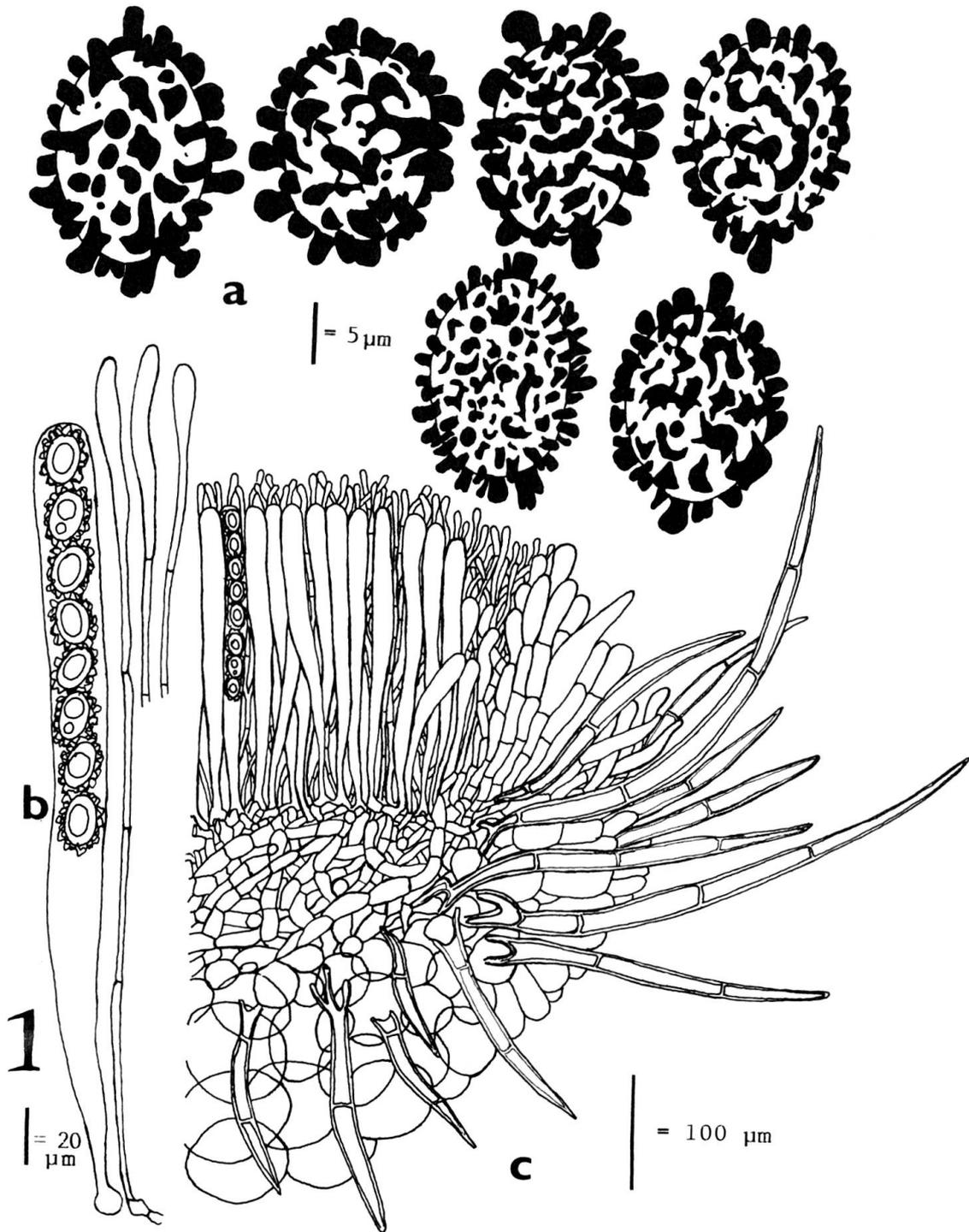
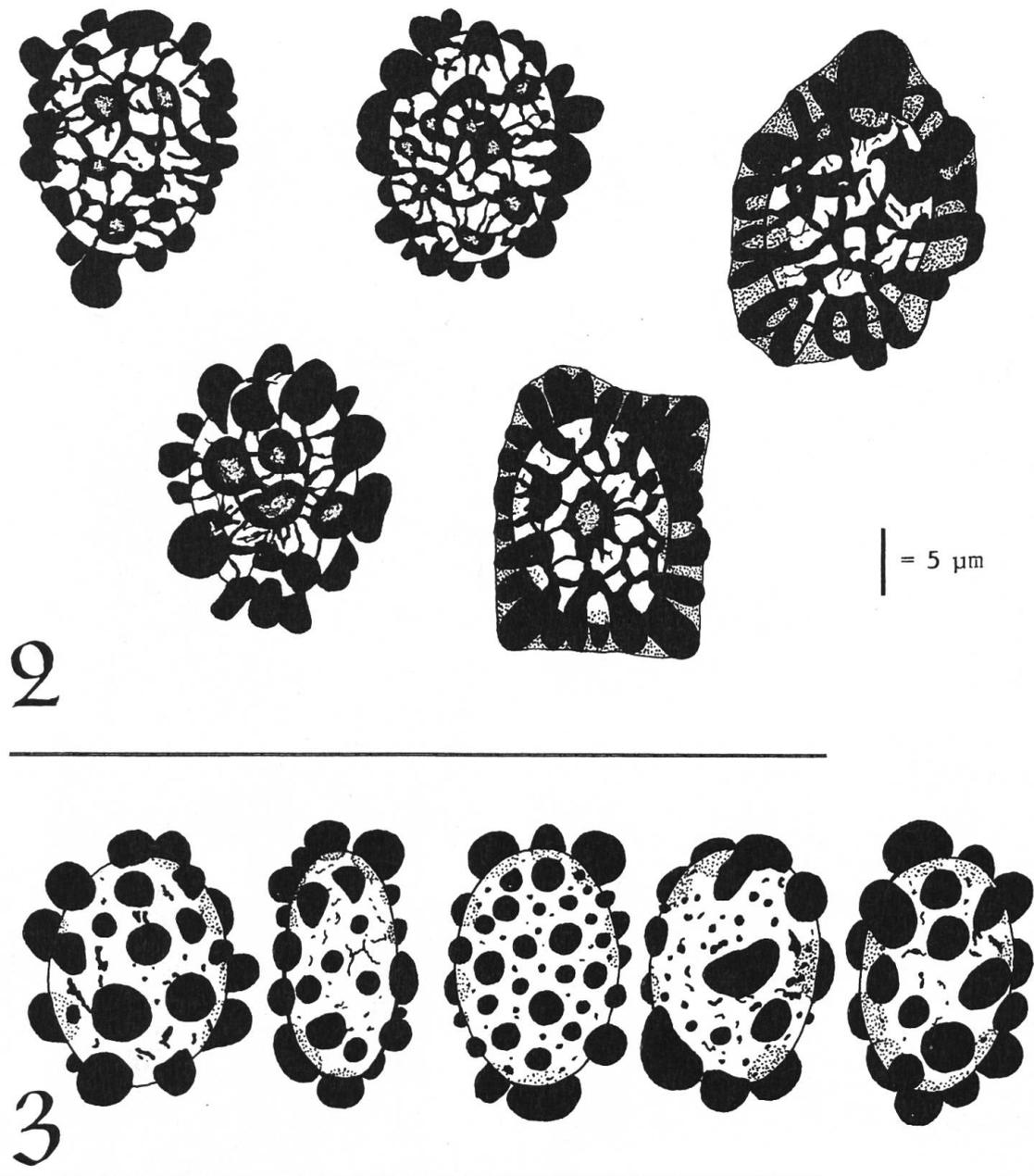
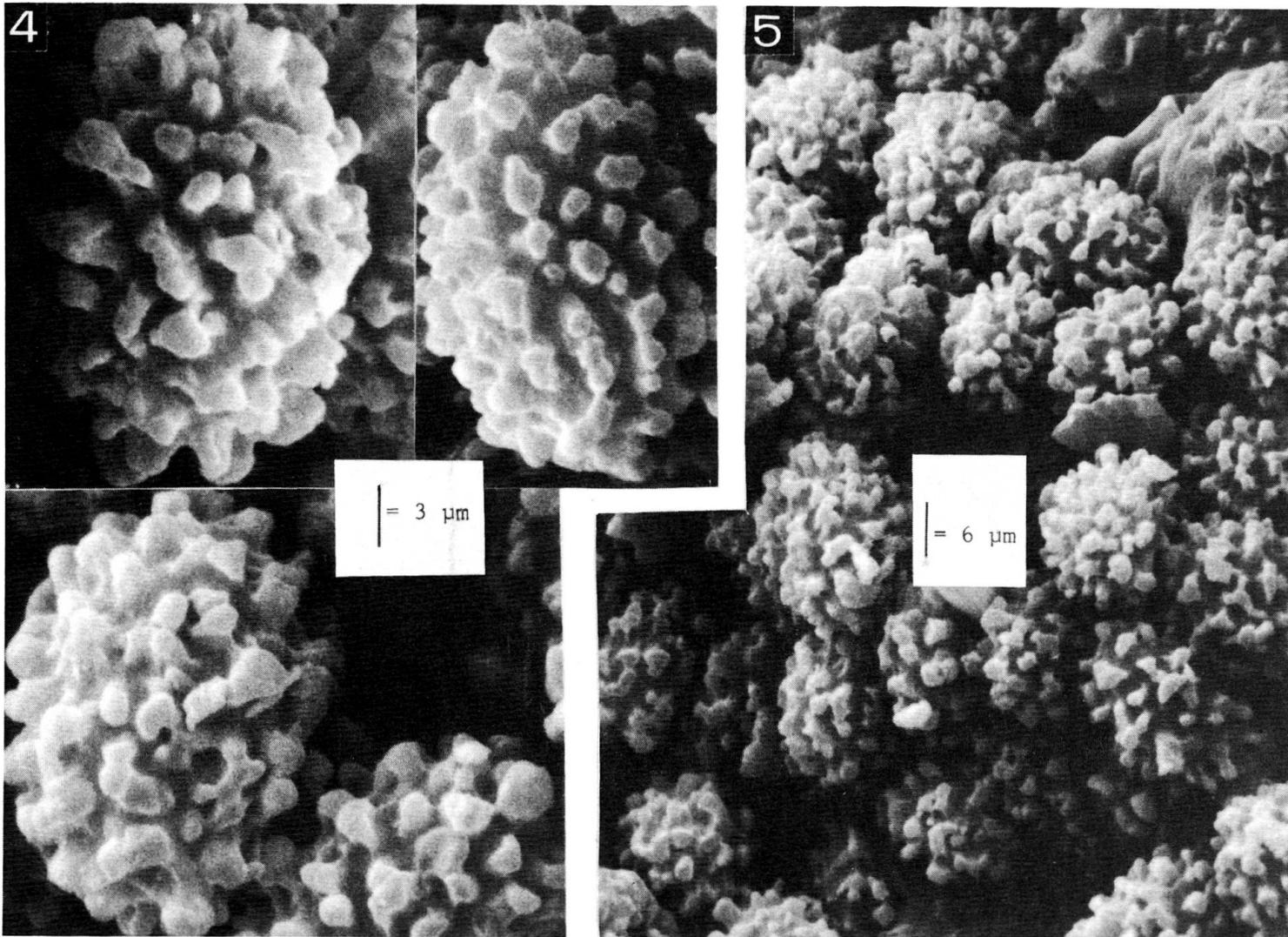


Fig. 1. *Scutellinia fujianensis*: a. Ascospores under oil immersion + CB; b. Ascus and paraphyses; c. Section of the marginal part of an apothecium. Type.



Figs. 2-3. Ascospores under oil immersion + CB:  
1. *Scutellinia* sp. (= *S. phlyctispora* sensu Schumacher 1982).  
Thailand, Cangwat Chiang Mai (O).  
3. *Scutellinia phymatodeus*. Type.



Figs 4-5. SEM of ascospores of *Scutellinia fujianensis* spec. nov. Type.