

BASIDIOMYCETES OF SOUTH-EAST ASIA

2. On *Scenedium apiarium*, with a discussion of the nomenclatural status
of the genus *Hexagonia* Pollini (*Hexagona* Fr.)

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Scenedium apiarium (Polyporaceae s.lat.) is described and illustrated. The nomenclatural problems associated with *Hexagonia* are discussed. *Hexagonia* Pollini, typified by *H. mori*, is a possible synonym of *Polyporus*. The name '*Hexagona* Fr.' was never validly published. The tropical species formerly included in *Hexagonia* belong to *Scenedium*.

Among wood-rotting polyporoid fungi, the genus *Hexagonia* 'Fries' is one of the more conspicuous genera. Owing to its often large and more or less hexagonal pores, the genus was easily recognized and became a depository for all polypores with such pores and corky to woody pilei. Thanks to the excellent revision of the genus by Fidalgo (1968b), *Hexagonia* is now well defined and comprises seven to fourteen species. Almost all species of *Hexagonia* show a tropical distribution, with only one somewhat deviating species (*H. nitidia*) recognized in Europe; the latter species, however, is according to Donk better placed in a separate genus *Apoxona*.

Hexagonia, as restricted by Fidalgo (1968b), is characterized by lignicolous, sessile basidiocarps with coriaceous to corky consistency. Pilei are dimidiate or flabelliform, applanate to conchate, with a smooth or velutinous to strigose upper surface. The brown context becomes dark brown to black in KOH. The hymenial surface is poroid, not lamellate, with large or small, often hexagonal pores; tubes are in one layer, not distinctly stratified. Hyphal pegs are often abundant, yellow to dark brown, conical, and mainly composed of skeletal hyphae. The hyphal system of the context and dissepiment trama is trimitic. Generative hyphae are hyaline, thin-walled, with clamps. Skeletal hyphae are yellowish brown to distinctly brown, thick-walled, rarely solid, unbranched, with secondary septa. Binding hyphae are hyaline to yellowish brown, thick-walled to solid, strongly branched to coralloid. Basidia collapse easily and then form a honeycomb pattern; they are hyaline, clavate, and four-spored. Spores are hyaline, cylindrical, thin-walled, smooth inamyloid; they are rarely found in herbarium specimens.

The genus *Hexagonia* resembles genera like *Trametes* (incl. of *Coriolus*) and *Cerrena* but differs in its yellowish brown skeletal and binding hyphae which are more reminiscent of *Coriolopsis*. Although *Hexagonia*, as defined by Fidalgo (1968b), is easily recognized, there remain problems concerning the typification of the genus, and the question whether '*Hexagonia* Fr.' is identical with *Hexagonia* Pollini. Fidalgo (1968a) believed that the genus '*Hexagonia* Fr.' is different from *Hexagonia* Pollini, whereas Donk (1969) argued that '*Hexagonia* Fr.' is nothing but a validation of *Hexagonia* Pollini and that only one genus which must be called *Hexagonia* Pollini ex Fries is involved.

With the recent change of the starting point for nomenclature of fungi, this additional aspect has to be considered, and since the underlying problems are rather complex, it seems worthwhile to discuss the essential points in detail.

(i) *Hexagonia* Pollini (1816) was described as a monotypic genus, the only included species being *H. mori* Pollini (1861), a polyporoid, lignicolous species from Italy with elongated hexagonal pores. Prior to the change of the starting point, that genus was unavailable because it was published before 1821, but now it is acceptable as a validly published generic name.

(ii) In 1836 (*Flora Scanica*: 339), Fries listed a genus *Hexagona* (sic!) with a short description but he did not cite the author of the genus nor any specific names; he also introduced the slightly different spelling of the name. In the same year, Fries (1836, *Genera Hymen.*: 11) mentioned the authorless genus *Hexagona* again, furnished a short description and indicated that the genus contained twelve species.

(iii) Finally, Fries (1838: 496) gave descriptions of *Hexagona* and its twelve species. He distinctly and without reservation referred the genus to Pollini, calling it '*Hexagona*. (Pollini, pl. nov.; p. 35)', and included the type species of *Hexagonia*: '*H. Mori*, ... Poll. pl. nov. p. 35 ...' (loc. cit.: 496). Apart from this European species, all other eleven species were of tropical origin. Fries had not seen specimens of *H. mori*, but he obviously knew Pollini's publication which not only contains lengthy descriptions but also good drawings of that species. The diagnosis of *Hexagonia* which Fries published (sub *Hexagona*) (Fries, 1838: 496) does not contradict his description of *H. mori* (loc. cit.: 497) and there is no reason to assume that it was Fries' intention to publish a genus different from that of Pollini. His reference to Pollini, instead, is without any reservation, and the inclusion of the type species *H. mori* (as fifth species) indicates that he fully accepted Pollini's genus, which he emended by also including eleven tropical taxa. We know that the genus *Hexagonia* Pollini as emended by Fries (1838) is artificial. The twelve species initially included by Fries belong to four or five different and not closely related genera. This, however, was not known to Fries himself who, also in subsequent publications (Fries, 1851: 101, as 'Epicr. 5-8'; 1874: 590), included *H. mori* in his systematic treatments of *Hexagonia*.

The first author to study the problem from a nomenclatural point of view was O. Kuntze (1898) who indicated *H. mori* as the type of *Hexagonia* Pollini (and was followed by Hariot, 1891: 204; Murrill, 1907: 47; Donk, 1960: 225; and others). Kuntze separated the heterogeneous tropical species which Fries had included in the emended genus

Hexagonia, and placed them in the genus *Scenedium* (Klotzsch) O. Kuntze. This decision, as far as the separation from *Hexagonia* s.str. is concerned, was and still is correct, and is probably more convincing after the recent change of the starting point for fungi.

(iv) The new starting point for fungi is Linnaeus 1753, but names in Fries, *Systema Mycologicum* (1821–1832) and *Elenchus Fungorum* (1828) are protected. The genus *Hexagonia* as emended by Fries (1838) is not protected and has consequently no priority over *Hexagonia* Pollini (1816). Hence, the discussion as to whether Fries (1838) published a new genus *Hexagona* not typified by *H. mori* is useless and does not influence the nomenclatural status of the validly published genus *Hexagonia* Pollini (1816).

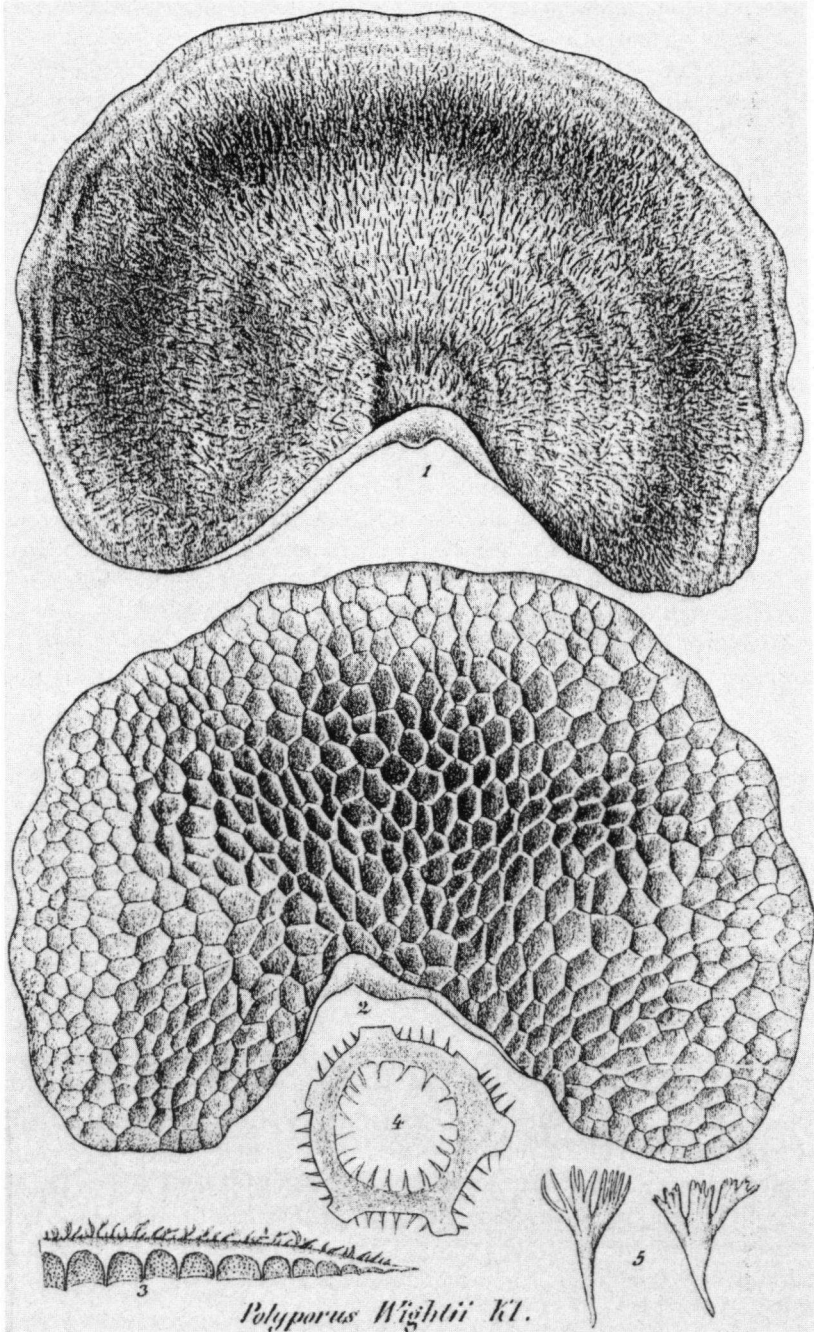
The problem remains, however, what to do with the species now included in *Hexagonia* ss.auct. (Fidalgo, 1968b). The genus *Favolus* is often cited in connection with *Hexagonia mori* or with other species of *Hexagonia*. But this name is not available for the following reasons:

Favolus Palisot (1803) was based mainly on *F. hirtus* Palisot (1803), a species with wide hexagonal pores collected in Africa. Although Palisot de Beauvois wrote that one of Bulliard's species (the name of which was not given) and several other species also belong to *Favolus*, only *F. hirtus* was specifically mentioned and was consequently accepted as the generic type by many mycologists. Fries (1821: 342) adopted Palisot de Beauvois name, although as a subgenus '*Favolus*. Pal. l.c.' of *Polyporus*, and included the type species as '10. P. *Fav. hirtus*, ...' also in *Polyporus*. In the *Epicrisis* Fries (1838: 496) transferred the species to *Hexagonia* where it has remained (Fidalgo, 1968b; Ryvarden & Johansen, 1980). *Favolus* Palisot (1803) is therefore the oldest generic name for the tropical species of *Hexagonia*, but it was unfortunately sanctioned by Fries (1821) only at the subgeneric level.

In the *Elenchus*, one of the 'sanctioning' books, Fries (1828: 44) described a completely different genus under the same name *Favolus*. This monotypic genus was based on *F. brasiliensis* Fr., a species from Brazil, with *Merulius alveolaris* DC. mentioned as a possible second species. In this publications *Favolus* Palisot is not cited under *Favolus* Fr., while *F. hirtus* Palisot is only mentioned under *Polyporus* (l.c.: 73) with reference to his treatment of the species in volume 1 of *Systema Mycologicum*.

Thus, Fries (1828) in describing a completely different genus also called *Favolus*, created a later homonym of *Favolus* Palisot (1803); *Favolus* Fr. would have to be dropped, had it not been published in one of the 'sanctioning' books. Hence, we have to accept *Favolus* Fr. and reject the older name *Favolus* Palisot. The genus *Favolus* Fr., as typified by *F. brasiliensis* Fr., is closely related to *Polyporus*. It differs mainly in having clampless generative hyphae (*Polyporus*, except for *P. badius*, has clamped generative hyphae) and a dimittic hyphal system with slightly branched skeletal hyphae (*Polyporus* is dimittic with binding hyphae instead); all hyphae are hyaline. The differences between *Polyporus* (incl. *Hexagonia mori*) and *Favolus* Fr. are not great, but the tropical *Hexagonia* species with a trimitic hyphal system of brownish skeletal and binding hyphae are widely different.

This leaves us with the following set of genera:



Polyporus Wightii Kl.

(a) Genera with hyaline hyphae and a dimitic hyphal system:

Polyporus Mich. ex Adans.: Fr. 1821. —

Type species: *Polyporus tuberaster* (Pers.) Fr. 1821.

Hexagonia Pollini 1816. —

Type species: *H. mori* Pollini 1816.

Favolus Fr. 1828 (sanctioned). —

Type species: *F. brasiliensis* Fr. 1828.

(b) Genera with brownish hyphae and a trimitic hyphae system:

Favolus Palisot 1803 (unavailable because of *Favolus* Fr. 1828). —

Type species: *Favolus hirtus* Palisot 1803.

Hexagonia sensu Fr. 1838 pro parte (excl. of type).

Fortunately, there are two validly published generic names, *Scenidium* (Klotzsch) O. Kuntze 1898 and *Pogonomyces* Murrill 1905, that are available for tropical species of *Hexagonia*. The first one, *Scenidium*, is the oldest one. It was introduced first as *Polyporus* trib. *Scenidium* Klotzsch 1832 for *Polyporus wightii*, and elevated to generic rank by O. Kuntze (1898: 515). The type, *Polyporus wightii* Klotzsch, is one of the typical members of tropical *Hexagonias*. Thus *Scenidium*, being the oldest available name for the group of tropical species formerly called *Hexagonia*, has to be accepted.

SCENIDIUM (Klotzsch) O. Kuntze

Scenidium (Klotzsch) O. Kuntze, Rev. Gen. Pl. 3(2): 515. 1898. — Type species: *Polyporus wightii* Klotzsch 1833.

Favolus Palisot, Fl. Oware 1: 1. 1803; non *Favolus* Fr. 1828. — Type species: *Favolus hirtus* Palisot 1803.

Hexagonia sensu Fr. 1838, pro parte (excl. type); non *Hexagonia* Pollini 1816.

Pogonomyces Murrill in Bull. Torrey bot. Club 31: 609. 1905. — Type species: *Boletus hydnoides* Swartz 1788.

For a long while the status and typification of *Hexagonia* has been under discussion, resulting in a lot of confusion. Obviously there was, and perhaps still is, a great reluctance to abandon the generic name *Hexagonia*, not because it is the name of a large genus, but because *Hexagonia* is one of the few generic names with an obvious meaning (hexagonal pores). But we should keep in mind that this type of pore, which gave the impetus for the erection of the genus, is observed in several unrelated genera of polypores and a few agaricoid genera. According to Fidalgo (1968b), more than 200 specific combinations have been made in *Hexagonia*, only a very small portion of which apply to the seven species of *Hexagonia* which she accepted. Thus the name *Hexagonia* is not as distinctive as first thought, making it easier to accept the oldest valid name *Scenidium*. This proposal was already made by O. Kuntze in 1898 who also has made almost all necessary specific combinations in *Scenidium*. With the adoption of *Scenidium* as the

Fig. 1. *Scenidium wightii*. Illustration from Klotzsch (1832), showing (1) upper and (2) lower surface, (3) longitudinal and (4) horizontal section with hyphal pegs, and (5) tufts of hairs.

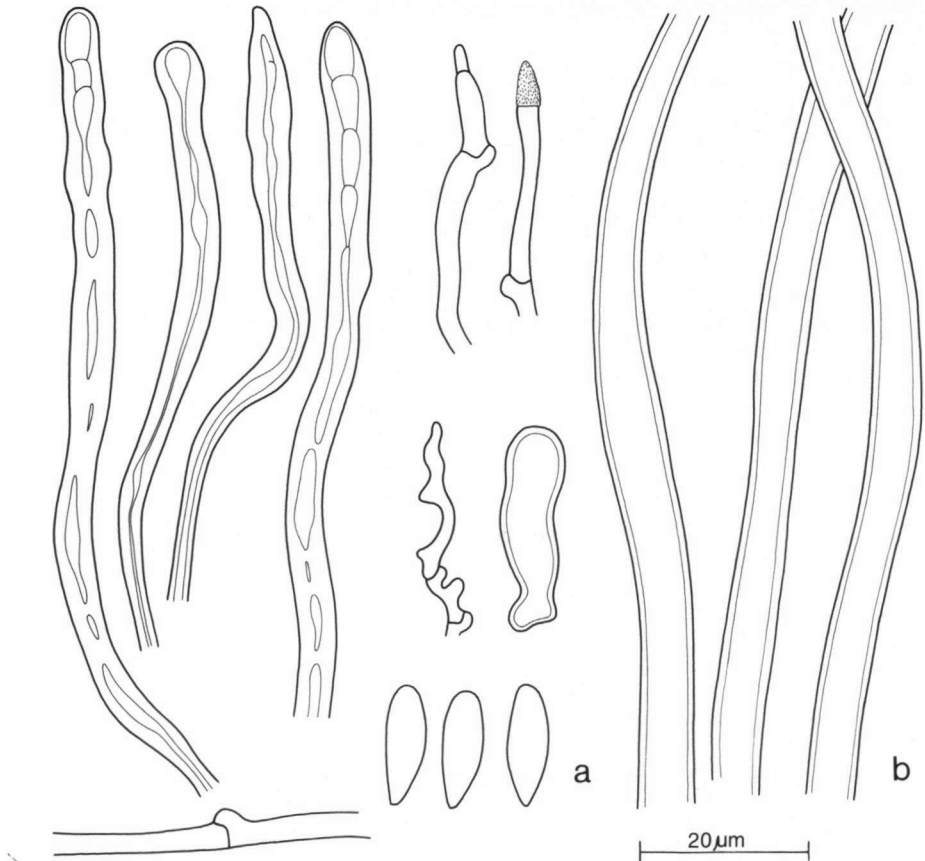


Fig. 2. *Scenidium apiarium*. — a. Elements of the catagymenium: skeletal hyphae, gerative hypha, hyphidia, and spores. — b. Skeletal hyphae of hairs. (From *Boden Kloss*, 2.IX.1927).

oldest available name for tropical Hexagonias, a solution based on the rules of the Code of Nomenclature and the prescribed startingpoint books, a major problem has been solved; in the words of Fidalgo (1968: 38) 'among the polypores there are very few names that were so much confused as *Favolus* and *Hexagona*'.

After a cursory study of some tropical species, one taxon, viz. *Scenidium apiarium*, has been studied in detail and is here described and illustrated.

Scenidium apiarium (Pers.) O. Kuntze

Scenidium apiarium (Pers.) O. Kuntze, Rev. Gen. Pl. 3: 516. 1898.

Polyporus apiarius Pers. in Gaudichaud, Bot. Voy. Uranic Freyc. 169–170. 1827 ('1826').

Hexagonia apiaria (Pers.) Fr., Epicr. Syst. Mycol. p. 497. 1838. (for further synonyms see Fidalgo, 1968b: 41).

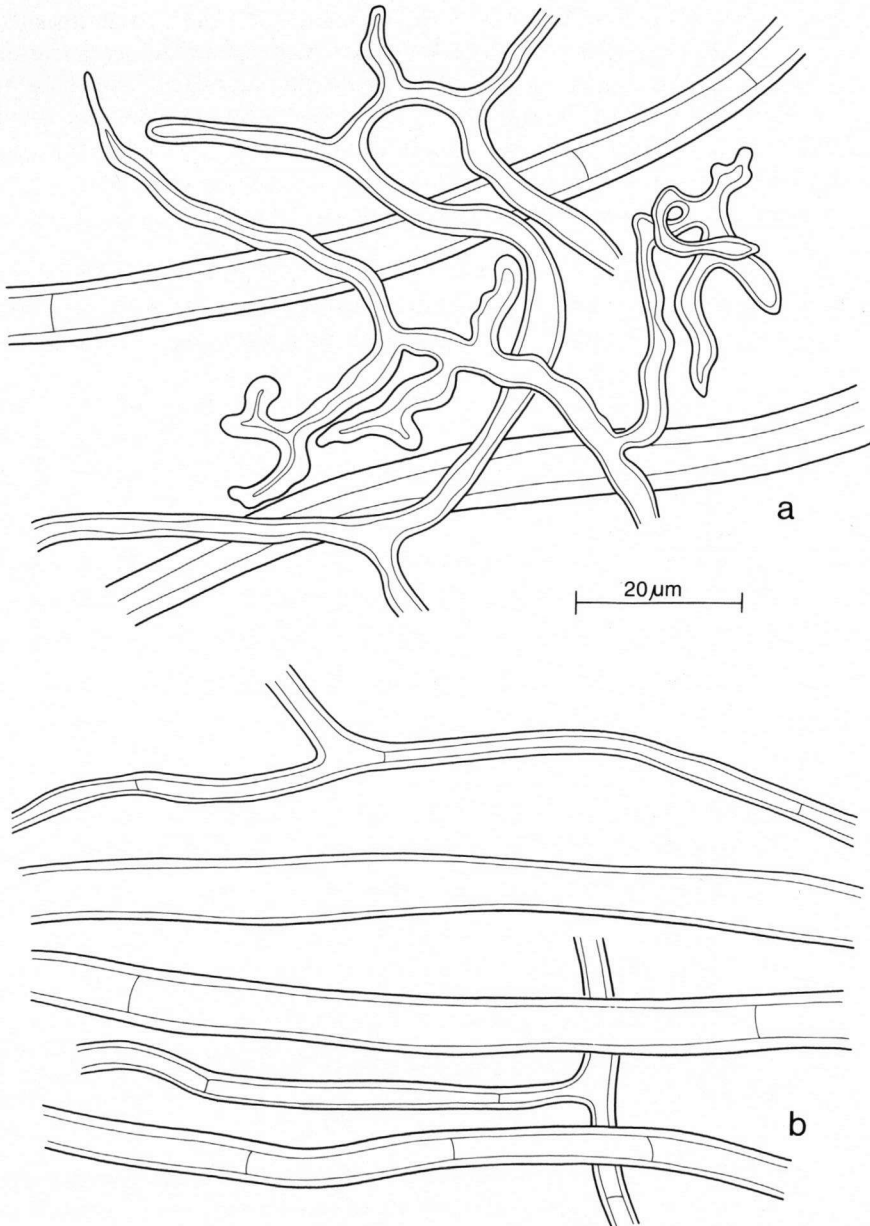


Fig. 3. *Scenidium apiarium*. — a. Skeletal and binding hyphae from the dissepiments. — b. Skeletal hyphae from the context. (From *Boden Kloss*, 2.IX.1927).

Basidiocarp annual, pileate, sessile, dimidiate to flabelliform, usually applanate, rarely slightly concave, 4–15 cm broad, 3–8 cm in radius, 0.3–1.0(–2.0) cm thick, coriaceous to corky. Upper surface of pileus pale brown to dark brown, old specimens somewhat blackish, strigose, densely or sparsely covered with fasciculated hairs, hairs often somewhat branched, almost entirely composed of longitudinally arranged skeletal hyphae; some specimens, especially older ones, almost glabrous. Context brown, dark brown to blackish with KOH, thin, usually not more than 1–2 mm thick. Hymenial surface poroid with regular hexagonal to slightly elongated pores (2–4 per cm). Tubes greyish to ochraceous, up to 1(–1.5) cm long. Hyphal pegs common, up to $200 \times 80 \mu\text{m}$, brownish, built up by straight or slightly torulose, yellowish brown skeletal hyphae with few hyaline generative hyphae. Hyphal system trimitic. Generative hyphae hyaline to pale yellowish, 2–4 μm , thin- to somewhat thick-walled (0.2–0.4 μm), with clamps. Skeletal hyphae yellowish to brownish, 3–5–8 μm wide, thick-walled (0.8–1.5 μm), not or only slightly branched. Binding hyphae yellowish, 1.5–3 μm wide, thick-walled (0.6–1.5 μm), branched to torulose. Catahymenium mainly composed of skeletal hyphae, some sparingly branched binding hyphae, as well as hyphidia or short generative hyphae; these generative hyphae are hyaline, straight or somewhat torulose, thin-walled, and with tips either thick-walled or encrusted with small granules or crystals, and breaking off easily. Basidia mostly collapsed, hyaline, clavate, $20\text{--}30 \times 6\text{--}8 \mu\text{m}$, four-spored. Spores hyaline, cylindrical to narrowly ellipsoid, $11\text{--}16 \times 4.5\text{--}6 \mu\text{m}$.

Habitat. — On deciduous wood.

Specimens examined. — AUSTRALIA. Queensland, *Hartmann 52* (K); — Bloomfield River, *Bauer* (K). — Behar, Soane River, herb. *Hooker 1867* (K). — Port Denison, Fitzalan, 1882, *F. von Mueller* (K).

INDONESIA. Irian Jaya, Humboldt Bay, ridge, 14.I.1912, 500 ft., *L. S. Gibbs 5401* (K). — Monoari, 14.I.1913, 500 ft., *L. S. Gibbs 5700* (K). — Arfak Mts., foothills, XII.1913, 400 ft., *L. S. Gibbs 6149* (K). — Keravat, Rabaul, X.1955, *W. P. K. Findlay* (K).

PAPUA NEW GUINEA. Presumably Koitaki, 1935, *Carr 11265* (K). — Matanakunai, Open Bay, Gazelle Peninsula, New Britain Distr., 9.IV.1968, *P. A. Wright FM 627* (K). — Lae, S.P.T. Logging Rds., 18.VIII.1968, *P. A. Wright FM 868* (K).

BRITISH SOLOMON ISLANDS. Without locality, II.1885, *Guppy* (K). — Guadalcanal, late 1972, *G. Jackson G 8* (K).

MALAYSIA. Malaya, Kedah, Pulau Dayang Bunting Langkani, 23.VIII. 1925, *R. E. Holtum 15116* (K). — Malaya, Pohang, Krau Game Reserve, Kuala Lompat Post, 9.III.1977, *S. F. Sharma F/057* (K). — Sabah, Banguay Island, 2.IX.1927, *C. Boden Kloss* (Fungi of Borneo 19226; K).

THAILAND. Without locality, 1859, *Mouhot* (K). — Without locality, III.1928, *T. D. Cockerell* (K). — Pha nok Kao, Loei, 22.II.1958, *P. S. 1358* (K). — Without locality, 1963, *J. Khan* (K).

PHILIPPINES. Without locality, in herb. Berkeley (K). — Without locality, *Cuming 1989* (K). — Luzon, Prov. of Benquet, XI. 1909, *H. M. Curran* (For. Bur. 19226; K). — Luzon, Prov. of Bulacan, Angat, II.1919, *M. Ramos & G. Eidano* (Bur. Sci. 34264; K). — Luzon, Prov. of Ilocos Norte, Burgos, II–III.1917, *M. Ramos* (Bur. Sci. 27821; K). — Luzon, Prov. of Tayabas, Mt. Malaraya, XI.1907, *H. M. Curran & M. R. Merritt* (For. Bur. 8956; K). — Luzon, Prov. of Bataan, Mt. Mariaveles, IX.1904, *A. D. E. Elmer* (K). — Davao, Mindanao, 25.III.1904, *E. B. Copeland 635* (K).

HONG KONG. On living *Bischofia* trees, 17.VI.1904, no collector mentioned (Herb. Hong Kong 1326; K).

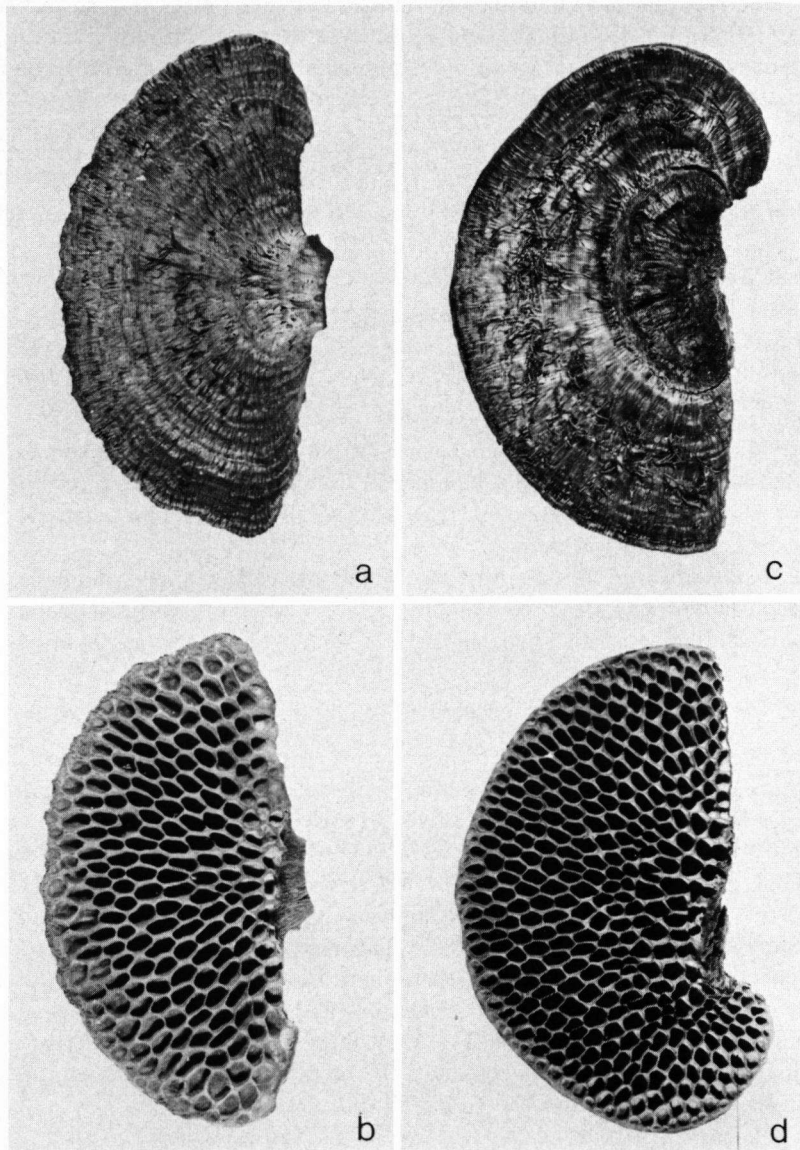


Fig. 4. *Scenidium apiarium*. — a, b. Thailand, 22.II.1958, leg. P.S. — c, d. Thailand, III.1928, Cockerell. (All natural size.)

SRI LANKA. Without locality, Gardner (K). — Anuradhapura Dist., Ritigala Nat. Res., IX.1972, A. H. M. Jayasuriya 2133 (L).

The species is not uncommon in Asia and has been described fairly recently by Cunningham (1965), Fidalgo (1968b), and Ryvar den & Johansen (1980). It is easily recognized because of its wide, hexagonal pores and the branched hyphal fascicles on the surface of the pileus.

Only three species of *Scenidium* have been reported from Asian or Australasian countries, viz. *Scenidium apiarium*, *S. asperum*, and *S. papyraceum*. *Scenidium asperum* was placed in *Hexagonia* by Fidalgo (1968b) while Ryvar den and Johansen treated the species under *Corioloopsis*, a closely related genus. The differences between the two genera are small; *Scenidium* often has larger spores and pores than *Corioloopsis*. Since *S. asperum* has in young state the typical forked 'hairs' on the surface of the pileus, it is here retained in *Scenidium*. The species *S. papyraceum* is rather widespread in North, South and Central America (including the West Indies) while only one record from South Africa and New Caledonia is cited by Fidalgo (1968b).

Distribution of species of *Scenidium* in Asia and Australasia (in alphabetical order).

Scenidium apiarium: Australia, Cambodia, China, India, Indonesia (Celebes, Java, New Guinea), Japan, Malaysia (Malaya), New Zealand, Philippines, Rawak Islands, Samoa, Sri Lanka, Taiwan, Vietnam.

Scenidium asperum: Assam, Australia, Cambodia, China, India, Indonesia (Flores, Java, Kalimantan, Krakatau, New Guinea, Salak, Sewarang), Malaysia (Malaya), New Caledonia, Philippines, Sabah, Sakhalin Island, Samoa, Singapore, Solomon Islands, Sri Lanka, Taiwan, Vietnam.

Scenidium papyraceum: New Caledonia.

The following fourteen species are accepted in *Scenidium*: *Scenidium apiarium* (Pers.) O. Kuntze 1898, *Scenidium asperum* (Jung.) comb. nov. (basionym: *Polyporus asper* Jung. in Verh. Batav. Genootsch. 17: 60. 1838), *S. capillaceum* (Pat. & Gaill.) O. Kuntze 1898, *S. hirtum* (Palisot: Fr.) O. Kuntze 1898, *Scenidium hydnoideum* (Sw.: Fr.) comb. nov. (basionym: *Boletus hydnoides* Swartz, Nov. Gen. Spec. Pl.: 149. 1788; Fries, Syst. Mycol. 1: 362. 1821), *S. niam-niamense* (P. Henn.) O. Kuntze 1898, *S. nitidum* (Dur. & Mont.) O. Kuntze 1898, *S. papyraceum* (Berk.) O. Kuntze 1898, *Scenidium pobeguinii* (Hariot) comb. nov. (basionym: *Hexagonia pobeguinii* Hariot in Bull. Soc. mycol. France 8: 28. 1892), *S. speciosum* (Fr.) O. Kuntze 1898, *S. tenue* (Hook.) O. Kuntze 1898, *S. umbrinellum* (Fr.) O. Kuntze 1898, *S. velutinum* (Pat. & Har.) O. Kuntze 1898, *Scenidium zambesianum* (Torrend) comb. nov. (basionym: *Hexagonia zambesiana* Torrend in Brotéria (Bot.) 12: 59–60. 1914).

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