

Catatan Tentang *Scleroderma pseudostipitatum* Petch, *Scleroderma verrucosum* (Bull.) Pers., and *Scleroderma nitidum* Berk. (*Gasteromycetes*)

Notes on *Scleroderma pseudostipitatum* Petch, *Scleroderma verrucosum* (Bull.) Pers., and *Scleroderma nitidum* Berk. (*Gasteromycetes*)

Rifai MA

¹ Indonesian Academy of Sciences/AIPI, Jakarta, c/o "Herbarium Bogoriense" Pusat Penelitian Biologi–Lembaga Ilmu Pengetahuan Indonesia (LIPI).

Rifai, MA. 2017 – Notes on *Scleroderma pseudostipitatum* Petch, *Scleroderma verrucosum* (Bull.) Pers., and *Scleroderma nitidum* Berk. (*Gasteromycetes*). Jurnal Mikologi Indonesia 1(1), 11-14.

Abstrak

Jamur *Scleroderma pseudostipitatum* yang hidup di tropik dikukuhkan sebagai jenis sendiri, dibedakan dari *Scleroderma verrucosum* yang berasal dari daerah beriklim sedang karena memiliki basidiospora yang lebih besar ditutup oleh duri-duri yang lebih pendek tetapi lebih gemuk, serta juga oleh peridium lebih kuning yang dihias dengan sisik berbeda susunan dan warnanya. Sejumlah catatan, gambar, dan pertelaan *Scleroderma pseudostipitatum* dan *Scleroderma nitidum* Berk. serta juga kunci untuk mendeterminasinya disajikan.

Kata kunci – *Scleroderma* – *Scleroderma verrucosum* – ektomikoriza

Abstract

The tropical *Scleroderma pseudostipitatum* is reinstated as a distinct species, distinguished from the temperate *Scleroderma verrucosum* (Bull.) Pers. by its larger basidiospores which are covered with shorter but stubbier echinulations, as well as by yellower peridium covered with scales differently constructed and pigmented. Notes, illustrations, and descriptions of *Scleroderma pseudostipitatum* and *Scleroderma nitidum* Berk. are presented, together with a key to their respective determination.

Key words – *Scleroderma* – *Scleroderma verrucosum* – ectomycorrhiza

Introduction

In working up the fungus collection made by Dr. O. Jaag in Lesser Sunda Island in 1938, Boedijn (1940) identified the specimen Jaag 1925 as *Scleroderma pseudostipitatum* Petch, a species originally described from Srilanka. In 1978, I had the opportunity to compare that specimen — as well as other collections from Java—with the Srilankan authentic materials used by Petch in formulating his species in Kew Herbarium, and satisfied that they are all indeed conspecific. On the other hand, in monographing the genus *Scleroderma* Persoon, Guzman (1970) reduced the present species to the synonymy of the European *Scleroderma*

verrucosum (Bull.) Persoon, which I found difficult to accept for reasons hinted in the published summary of my observations on this species together with its related species from Malaysian area (Rifai, 1987).

Until now very little is known about this species, so that its present distribution in Malaysia is not yet clear as it was not indicated by Sims, Watling, de la Cruz & Jeffries (1997) whether or not it occurs in the Philippines. It is obvious that the specific delimitation of the genus *Scleroderma* as a whole is far from being satisfactory (Demoulin & Dring, 1975) in spite of the existence of Guzman's monographic study.

The following stray notes on these two species are presented here to show that critical evaluation of morphological and anatomical analyses maybe still useful in recognizing species of *Scleroderma*. It is hoped that future students of this forestically important group of fungi will elucidate the nature of their ectomycorrhizal association in relation to their speciation through cross inoculation studies, to be further backed up by modern molecular analyses currently much used in as an important tool in systematic biology researches.

Materials and methods

In the present study, microscopic analyses and basidiospore measurement were undertaken in lactic acid medium with or without addition of cotton blue.

Results and Discussion

Scleroderma pseudostipitatum Petch in Ann R bot Gard Perad 7: 77.1919.

Fruitbodies arising singly, sessile or provided with very short but distinct pseudostipe attaching directly to soil. *Pileus* relatively small, 1.5–3 cm in diameter, depressed subglobose, occasionally short obovoid with obconical base. Upper surface almost smooth, outer layer of peridium hardly flaking, often wrinkled giving a polygonal pattern 3–4 pro 2 mm, pale brownish yellow, becoming brighter and pale yellow towards the smooth lower surface. *Peridium* about 400 µm thick, much thicker towards the base, consisting of a very thin outer layer much darker than the dull yellow inner layer. *Gleba* olive green to olive brown, interspersed with yellow fragments of sterile layers forming rounded pockets. *Basidiospores* globose to subglobose, relatively large, brown, without ornamentations measuring 8.4–12 µm, crowdedly covered by short, stubby, wide, occasionally corniculate spines up to 1.5 µm long, making the spores appear to be larger of up to 14.5 µm diameter; only very rarely the spines appear to coalesce to form a very indistinct reticulation.

Notes: 1. Petch (*loc.cit.*) observed that when mature the dehiscence of fruitbody of this species took place at the apex, making the fungus becoming a deep stalked cup filled with a powdery mass of spores.

2. In describing this species Petch (*loc.cit.*) used at least three specimens, from Hakgalla (collected in September 1908, May 1912, and December 1917) and from Sita Eliya December 1917. The specimen of September 1908 was considered less typical by him, and from the remaining three specimens the one collected in May 1912 is herewith designated as the lectotype of *Scleroderma pseudostipitatum* since Petch did not indicate any type specimen.

Specimens examined – Lesser Sunda Islands: On the ground, Saumassi-Atimelang, Alor Isl, 22 May 1938, Jaag 1925 (BO 17236).—Java: on the ground, Mount Dieng, June 1937, Rijkebusch s.n. (BO 16319); on the ground, Pujon at the Slope of Mt Kawi at 1500 m alt, July 1937, van Heurn s.n. (BO 17321); *ibid.*, van Heurn s.n. (BO 17327).—Srilanka (Ceylon): on the ground, Hakgalla, September 1908, T.Petch (K); *ibid.*, May 1912, T.Petch (lectotype of *Scleroderma pseudostipitatum* Petch, here designated, K); *ibid.*, Desember 1917, T.Petch (K); on the ground, Sita Eliya, December 1917, T.Petch (K).

Scleroderma nitidum Berk. in Hooker's Journ Bot 6: 173. 1854.

Scleroderma tenerum Berk. & Curtis in J. Linn. Soc. Bot. 10: 346. 1869.

Fruitbodies arising singly, gregarious but never caespitose, distinctly but rather shortly stipitate. *Pileus* relatively small, 2–3 cm diameter, of irregular shape, mostly depressed globose, occasionally horizontally elongated and lobed, appearing dull whitish brown throughout, blotched with darker reddish brown coloured flakes of the exoperidium. Upper surface rough from the flaking and cracking exoperidium, the cracking of irregular size and shape, mostly of polygonal pattern, 1–5 pro 2 mm, becoming smoother and paler towards the base. *Stipe* flattened, rugose or grooved, dull whitish brown, mostly smooth surfaced, up to 2 cm high by 1 cm wide, distinctly rooted to the ground. Peridium less than 400 µm thick, consists of a very thin and darker coloured outer layer and a much thicker whitish brown inner layer. *Gleba* olive brown to milky chocolate brown. *Basidiospores* globose to subglobose, medium, medium sized and without ornamentation measuring 6.6–9 µm diameter, crowdedly covered with numerous spines of up to 1.8 µm long; spines straight or corniculate to occasionally strongly curved, making the spores appear larger in size up to 11.4 µm diameter.

Notes: 1. For want of better ideas, in the earlier publication (Rifai 1987), I referred the Malaysian specimens at my disposal to *Scleroderma nitidum* Berk., a species originally described from Nepal together with its later synonym *Scleroderma tenerum* Ber. from Cuba, both of which were included in *Scleroderma verrucosum* (Bull.) Pers. by Guzman (1970).

2. As can be gleaned from the above descriptions *Scleroderma pseudostipitatum* has yellower peridium provided with scales differently constructed and pigmented if compared with those of *Scleroderma nitidum*. Its spores are also slightly larger but covered by shorter though more stubby echinulations which appear darker coloured. The differences between *Scleroderma pseudostipitatum* and *Scleroderma nitidum* are somewhat similar to the distinction between their temperate counterpart species (namely *Scleroderma areolatum* Ehrenb. and *Scleroderma verrucosum* Pers.) as keyed out by Demoulin (1968) and Demoulin & Marriott (1981), except for the fact that the spore echinulations of *Scleroderma pseudostipitatum* are shorter than *Scleroderma areolatum*.

3. For these reasons, the two species are keyed out as follows (Rifai 1987):

a. Spore body 6.6–9 µm diam., covered with up to 1.8 µm long conical spines. Peridium with reddish brown scales *Scleroderma nitidum* Berk.

b. Spore body 8.4–1 µm diam., covered with short (up to 1.5 µm long) stubby spines. Peridium with brownish yellow scales *Scleroderma pseudostipitatum* Petch

4. As already indicated earlier (Rifai 1987), when the geographic distribution and the biological significance of the ectomycorrhizal association in delimiting species of *Scleroderma* are better understood, the present tropical species probably should be regarded as a subspecies of the subtemperate *Scleroderma verrucosum* (Bull.) Pers., with which it is mostly lumped. In this connection it should be pointed, however, that all tropical specimens I saw thus far come from mountain areas.

5. The presence of curved spore spines in *Scleroderma* has been hardly mentioned in the literature, although it is sometimes illustrated for example in *Scleroderma cepa* Pers.

Specimens examined – Java: on the ground, Mount Gedeh, West Java, 14 January 1926, Bruggeman (BO 6934); on the ground, path to Kandang Badak, Mount Gedeh, West Java,

April 1930, *Boedijn 481* (BO 11294); on the ground, Cibodas, West Java, October 1938, *Boedijn 3330* (BO 16536); *ibid.*, *Boedijn 3349* (BO 16541); on the ground, Pujon, East Java, ca 1000 m alt., *van Heurn* (BO 17333).—Nepal: on the ground, Nangki, at 3000 m alt. (K, type of *Scleroderma nitidum* Berk.).—Cuba: on the ground among mosses, *Wright 702* (K, type of *Scleroderma tenerum* Berk. & Curtis—Berkeley's Cuban Fungi no 512)

References

- Boedijn KB. 1940. The fungi collected by Dr. O. Jaag in Alor, Bali, and Flores (Lesser Sunda Islands). *Bull. Jard. Bot. Buitenzorg III*. 16: 245–252.
- Demoulin V. 1968. *Gasteromycetes* de Belgique: *Sclerodermatales*, *Tulostomatales*, *Lycoperdales*. *Bull. Jard. Bot. Nat. Belg.* 38: 1–101.
- Demoulin V and Dring DM. 1975. *Gasteromycetes* of Kivu (Zaire, Rwanda and Burundi). *Bull. Jard. Bot. Nat. Belg.* 45: 339–372.
- Guzman G. 1970. Monografía del genero *Scleroderma* Pers. emend. Ft. (*Fungi: Basidiomycetes*). *Darwiniana* 16 (1-2): 233–407.
- Rifai MA. 1987. Malesian *Scleroderma* (*Gasteromycetes*). *Trans. Mycol. Soc. Japan* 28: 97.
- Sims K, Watling R, de la Cruz R and Jeffries P. 1997. Ectomycorrhizal fungi of the Philippines: A preliminary survey and notes on the geographic biodiversity of the *Sclerodermatales*. *Biodiv. Conserv.* 6(1): 45–58.