

Supplementary remarks to *Austroboletus* (CORNER) WOLFE (Boletaceae)

E. HORAK

Geobotanical Institute, ETHZ, CH-8092 Zürich, Switzerland

Introduction

Originally the genus *Porphyrellus* GILBERT (1931) was exclusively based on *Boletus porphyrosporus* FRIES (1835), a rather rare, dark brown bolete with smooth, dark brown and fusoid spores (Horak, 1968). Subsequently SINGER (1945) emended the generic range by introducing taxa with punctate or perforate spores respectively. Over the years this concept has been further supplemented and finally *Porphyrellus* became a large genus containing 4 infrageneric sections (SINGER, 1975).

Already a few years earlier CORNER (1972), after examining pertinent Malaysian material, came to the conclusion to abolish SINGER's classification by accomodating all boletes with punctate-perforate spores in *Boletus* subgen. *Austroboletus* (type species: *Porphyrellus dictyotus* BOEDIJN, 1960).

WOLFE & PETERSEN (1978) critically discussed the infrageneric limits and levels of *Porphyrellus* (ss. SINGER) and subgen. *Austroboletus* (ss. CORNER) and proposed a new taxonomic scheme for *Porphyrellus*. A short while later this concept was overthrown again und finally WOLFE (1979) made the inevitable step to shift subgen. *Austroboletus* CORNER to generic rank. Simultaneously *Porphyrellus* s. str. was relegated as a subgenus to *Tylopilus*.

After being familiar (since 1967) with many taxa of *Austroboletus* (from fresh material and exsiccata as well) I am obliged to CORNER and WOLFE and accordingly support this new generic unit at least as a working hypothesis for further taxonomic research.

Obviously WOLFE & PETERSEN (1978) and WOLFE (1979) have had no access to several type collections. In addition the existing relevant literature was not completely considered and evaluated. Under this circumstances this addendum is intended to complement the taxonomic and mycogeographic information on *Austroboletus* by adding a few and further so far unknown or omitted data.

Acknowledgements

I am indebted to the Curators of the Herbaria BR, C, FH, K, L and PC for the loan of material. Prof. E. J. H. CORNER (Cambridge, U. K.) and Dr.

T. HONGO (Otsu, Japan) kindly supported my studies by sending exsiccata and unpublished information. My thanks are due to the authorities of the Department of Forest both in New Zealand and Papua New Guinea for the opportunity to work in these countries. Finally I am grateful to the Swiss Society of Natural Sciences for a travelling grant to Australasia (1977).

Type material of the new species is kept in ZT. If not otherwise stated the magnifications of the figures are: carpophores (nat. size), spores ($\times 2000$), basidia and cystidia ($\times 1000$) and cuticle (vert. section, $\times 500$).

Notes and descriptions

1. *Austroboletus alveolatus* (HEIM & PERREAU) HORAK, comb. nov.

— Pl. 1, A

Bas. *Porphyrellus alveolatus* HEIM & PERREAU 1964: Bull. Soc. Myc. France 80: 88.

Syn. *Boletellus alveolatus* (HEIM & PERREAU) SINGER 1970: Fl. Neotrop. 5: 24.

Illustrations. — HEIM & PERREAU (1964).

Material. — Mexico: Prov. Oaxaca, Albaradas, Santa Maria, 29. VII. 1959, leg. HEIM, 6272 (PC, holotype).

Habitat. — On soil under *Quercus* sp., 1800 m. — Mexico.

Remarks. — This remarkable bolete is well described and illustrated in the original diagnosis. It is suspected that this Mexican species has close affinities to *A. betula* (SCHWEINITZ) and to a lesser degree also to *A. subflavidus* (MURRILL) WOLFE. Not only the macro-morphology of these three taxa is similar but also shape and type of ornamentation of the spores are very much alike. It has to be emphasized that the spores of *A. alveolatus* and *A. betula* have a distinct germ pore which, however, often is not easily to recognize under the thick perispore.

The spore morphology is also reminiscent of that found in *A. fruticicola* (BERK.) reported from Tasmania (Australia).

2. *Austroboletus betula* (SCHWEINITZ) HORAK, comb. nov. — Pl. 1, B

Bas. *Boletus betula* SCHWEINITZ 1822: Schr. Natf. Ges. Leipzig 1: 94.

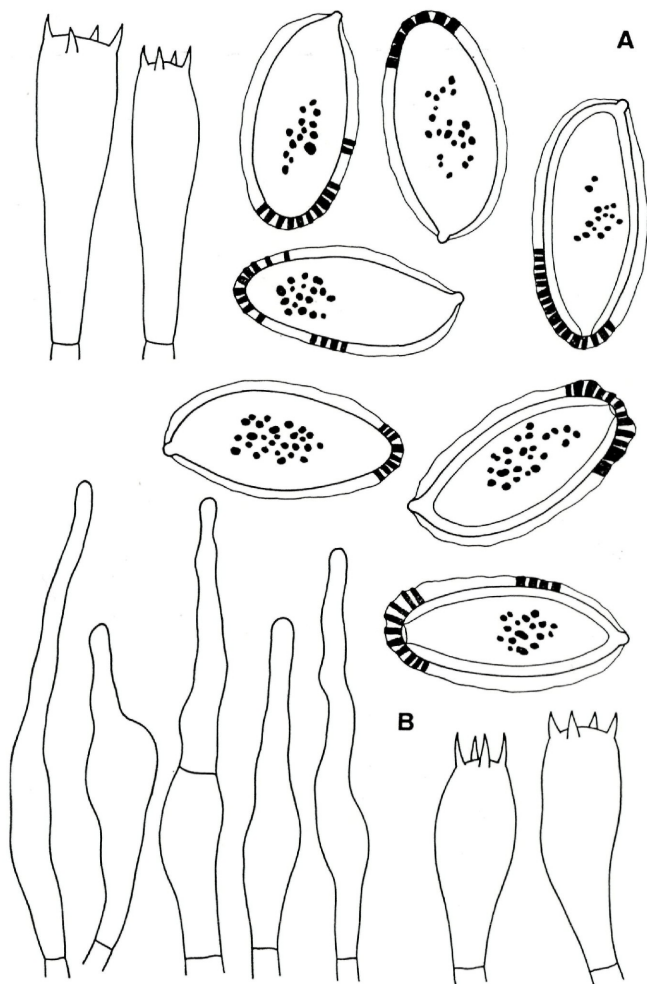
Syn. *Boletellus betula* (SCHWEINITZ) GILBERT 1931: Les Bolets, 108.

Illustrations. — PERREAU (1964), PERREAU & HEIM (1969), SNELL & DICK (1970), GRAND & MOORE (1971), SMITH & THIERS (1971).

Material. — USA: N. C., Swain Co., Almond, 17. VIII. 1971, leg. HARRISON. 10743 (MICH).

Habitat. — On soil in forests (*Quercus* sp., more rarely *Pinus* sp.). — USA (eastern and southeastern provinces).

Remarks. — The sketches in pl. 1, B demonstrate that *A. betula* is a close ally both of *A. alveolatus* (HEIM & PERREAU) — from



Pl. 1. A. *Austroboletus alveolatus* (HEIM & PERREAU) HORAK (type): spores, basidia. — B. *Austroboletus betula* (SCHWEINITZ) HORAK (MICH, HARRISON, 10743)

Mexico — and *A. fruticicola* (BERK.) — from Tasmania (Australia). WOLFE (1979) indicated that *B. betula* has features similar of those characteristic for the genus *Austroboletus*. However, a formal transfer of *B. betula* to *Austroboletus* has not been made yet.

3. *Austroboletus cookei* (SACCARDO & SYDOW) WOLFE 1979 — Pl. 2, B

Bibl. Mycol. 69: 88.

Bas. *Boletus cookei* SACCARDO & SYDOW 1899: Syll. 14: 170.

Syn. *Porphyrellus cookei* (SACC. & SYD.) SINGER 1945: Farlowia 2: 122.

= *Boletus lacunosus* COOKE & MASSEE 1889: Grevillea 18: 5 (non *B. lacunosus* OTTH 1857: Mitth. naturw. Ges. Bern, 37; non *B. lacunosus* ROSTRUP 1902: 357 (= *Austroboletus rostrupii* (H. & P. SYDOW) HORAK).

Illustrations. — COOKE (1892), WOLFE (1979).

Material. — Australia: Brisbane, leg. BAILEY, 649 (K, holotype of *B. lacunosus* C. & M.).

Habitat. — On sandy ground. — Australia (Queensland, ? Victoria).

Remarks. — According to WOLFE (1979) the type material is composed of several collections of which "BAILEY, 664" has been selected as lectotype.

A. cookei is a taxonomic puzzle. The painting in COOKE (1892, pl. 8, 50) depicts a medium-sized bolete with pale brown pileus, pink pores and strongly reticulated, bulbous(!) stipe. In the accompanying text, however, the stipe is described as "equal or attenuated upwards". Supposed COOKE's drawings are manufactured from the field notes then one could ask if the bulbous-clavate stipe is an invention influenced by the shape of several exsiccata (which in fact are having an obclavate stipe).

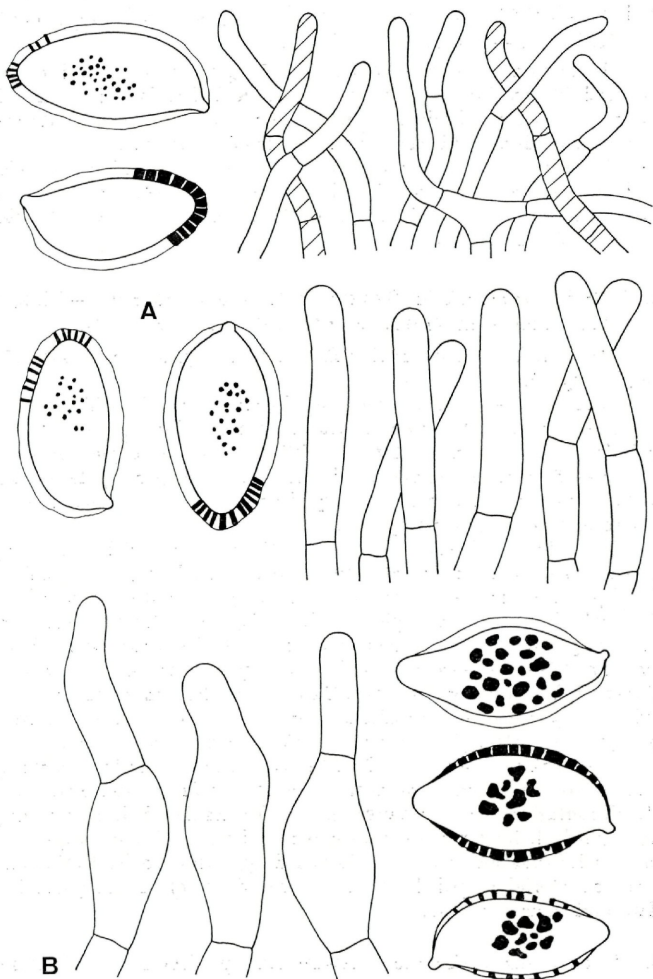
In the Herbarium of the Botanical Garden Melbourne, Australia (MEL), is a water colour deposited which illustrates a bolete with strongly reticulated, bulbous stipe. The species is named "*Boletus retipes* COOKE & MASSEE" (non *B. retipes* BERK. & CURT., 1872) but to my knowledge the authors have never published this epithet and my search for authentic exsiccata came to nothing. However, I do not exclude the possibility that COOKE & MASSEE worked this information also into the "mixed" description of *B. lacunosus*.

Under these circumstances I do not dare to relegate the well known *A. novaezelandiae* (MCNABB) WOLFE as a synonym to *B. lacunosus* C. & M. Further field work is needed to disentangle this taxonomic-nomenclatural problem.

4. *Austroboletus cornalinus* (PERREAU & HEIM) HORAK, comb. nov.

Bas. *Boletus (Xerocomus) cornalinus* PERREAU & HEIM 1976: Gard. Bull. Singapore 29: 158.

Illustrations. — PERREAU & HEIM (1976).



Pl. 2. A. *Austroboletus fruticicola* (BERKELEY) HORÁK (type): spores, cheilocystidia, cuticle. — B. *Austroboletus cookei* (SACCARDO & SYDOW) WOLFE (type): spores, caulocystidia

Material. — Gabon: Libreville, Forêt de la Mondah, 13. X. and 10. XI. 1968, leg. GILLES, 33 (PC, holotype). Material not studied.

Habitat. — On soil in rain forest.

Remarks. — PERREAU & HEIM (1976) give an excellent description and illustration of this fine Gabonese bolet. Based upon this information I strongly disagree with the result of the author's discussion by considering this species a member of *Xerocomus*.

According to the perforate-warted spores this African species undoubtedly has to be transferred to *Austroboletus*. *A. cornalinus* is a typical representative of the genus and belongs to sect. *Graciles* (SINGER) WOLFE (1979).

5. *Austroboletus fruticicola* (BERKELEY) HORAK, comb. nov. — Pl. 2, A
Bas. *Boletus fruticicola* BERKELEY 1848: Hooker J. Bot. 7: 574.

Material. — Australia: Tasmania, Penguinite, leg. GUNN, 1775 (K, holotype).

Habitat. — On soil, at roots of *Pleurodrum riparia* (Dilleniaceae).

Remarks. — According to the short original description *A. fruticicola* is characterized by the following macroscopic features: Pileus — 5 in. diam., convex, red, smooth. Tubes-pores pale orange-yellow, free around stipe. Stipe equal or attenuated below, smooth, not reticulate, single or cespitose.

The microscopic data observed on the type material are: Spores 13–16 × 7–8 μm (ornamentation up to 1.5 μm deep), amygdaliform to ellipsoid (in droso-ventral view), minutely punctate but with peg-like cylindric warts at apical end, perispore distinct, germ pore absent, yellow (KOH). Basidia: shape and size unknown. Cheilocystidia 35–45 × 6–8 μm , cylindric, apex rounded, membranes thin-walled, hyaline or yellowish. Cuticle a trichoderm of interwoven, cylindric hyphae (5–10 μm diam.), membranes hyaline, not gelatinized, pale yellow (KOH) pigment present. Clamp connections none.

Remarks. — As pointed out above *A. fruticicola* is apparently related to the North American taxa *A. betula* (SCHWEINITZ) and *A. alveolatus* (HEIM & PERREAU). The Tasmanian bolete is readily distinguished, however, by its smooth and not reticulate stipe. The present information is exclusively based upon the type collection and further material is needed for a better knowledge of the morphological data and their variation.

6. *Austroboletus fusisporus* (KAWAMURA ap. IMAZEKI & HONGO)
WOLFE 1979 — Pl. 6, B
Bibl. Mycol. 69: 96.

Bas. *Porphyrellus fusisporus* KAWAMURA ap. IMAZEKI & HONGO 1960:
Acta Phytotax. Geobot. 18: 110.

Illustrations. — HONGO (1960), WOLFE (1979).

Material. — Japan: Otsu, Miidera, 4. IX. 1954, leg. HONGO 993 (holotype; part in ZT 70/323).

Habitat. — On decayed wood. — Japan.

Remarks. — This species is well characterized by spores with very coarse peg-like warts (cp. SEM-micrographs in WOLFE 1979).

7. *Austroboletus gracilis* (PECK) WOLFE 1979

Bibl. Myc. 69: 69.

Bas. *Boletus gracilis* PECK 1872. Ann. Rep. N. Y. State Mus. 24: 78. Syn. See WOLFE (1979).

Illustrations. — PECK (1872: l. c.) HORAK (1976: 647 — as “*B. velutinus*”).

Material. — USA: New York Garrison's, Thurman, and Greig, leg. PECK (NYS, holotype). — Papua New Guinea: Eastern Highlands, E of Omaura, 30. V. 1973, leg. HORAK (ZT, 73/295). — Morobe district, Bulolo, Manki, 1200 m, 25. IV. 1972, leg. HORAK (ZT, 72/405).

Habitat. — On soil under *Castanopsis* sp. and *Lithocarpus* sp. (Fagales) in Papua New Guinea. Further ecologic data in WOLFE (1979). — USA, Japan, Papua New Guinea.

Remarks. — The area of distribution of *A. gracilis* is not restricted alone to the northern hemisphere (eastern parts of USA and Japan) alone but this bolet also occurs in Papua New Guinea (HORAK, 1976). Thus *A. gracilis* is another characteristic example for existing (but not well understood yet) mycogeographic relationships between New Guinea—Japan—eastern USA.

According to WOLFE (1976) *A. gracilis* is common and widely distributed in the eastern USA and it appears that both conifers (*Pinus*, *Tsuga*) and hardwoods (*Quercus*, *Carya*, *Acer*, *Betula*, *Castanea*) are involved in mycorrhizal symbiosis. In this connection it may be of interest to emphasize that the two New Guinean collections have been made under Fagales, viz. *Castanopsis* and *Lithocarpus*.

8. *Austroboletus latitubulosus* HORAK, spec. nov. — Pl. 3, A

Pileus — 20 mm, convexus, ex olivaceo ochraceus, squamis pyramidalibus fuscisque e centro instructus. Tubuli emarginati vel subdecurrentes, lati vel phylloporoidei, aurei dein sinapicolores. Stipes — 55 × — 4 mm, e cylindrico subfusioideus, fibrillosus, pallide brunneus, evelatus. Sporae 11 — 15 × 6 — 7.5 μm, ellipticae vel amygdaliformes, evelatus. Sporae 11 — 15 × 6 — 7.5 μm, ellipticae vel amygdaliformes, grosse verrucosae, flavobrunneae. Cystidia lageniformes. Hyphae defibulatae. Ad terram vel lignum putridum in silvis frondosis. Nova Guinea. Typus, ZT, 73/178.

Pileus 10—20 mm, hemispheric at first becoming convex or expanded; olive to ochraceous, centre covered with distinct, conic to pyramidal, fuscous, up to 2 mm high spines and warts, squamulose or

coarsely fibrillose towards margin; dry, any veil remnants absent. Tubes — 7 mm long, emarginate to subdecurrent, ventricose, golden yellow or mustard yellow, turning yellow-brown with age, pores rhomboid to sublamelliform with numerous anastomoses (especially towards margin in aged carpophores), normally 1–2 mm diam., concolorous with tubes. Stipe 25–55 × 2–4 mm, cylindric, occasionally subfusoid, often curved towards slightly attenuated base; pale brown, with white basal mycelium; dry, longitudinally fibrillose, solid, veil remnants absent, single. Context ochraceous yellow, not cyanescent. Odour and taste not distinctive.

Spores 11–15 × 6–7.5 μm , elliptic to subamygdaliform, with strongly developed apiculus, densely covered by coarse hemispheric or short-cylindric warts, yellow (KOH), plage or germ pore absent. Basidia 25–40 × 10–14 μm , 4-spored. Cheilocystidia (and pleurocystidia) 55–90 × 8–15 μm , lageniform to subfusoid, membrane thin-walled, hyaline or pale yellow, occasionally with secondary septum near base. Cuticle a trichoderm of bundled, cylindric hyphae (8–16 μm diam.), terminal cells cylindric or conic, membranes thin-walled, not gelatinized, encrustend by yellow (KOH) pigment. Clamp connections absent.

Material. — Papua New Guinea: Morobe district, Bulolo, Manki, 1200 m, 23. IV. 1973, leg. HORAK (ZT, 73/178, holotype). — Indonesia: West Irian, Ok Sibil, Basiskamp, 1260 m, 25. VIII. 1959, leg. B. O. van ZANTEN, 805 (L, 971.350-433).

Remarks. — The description of this new taxon is based upon two collections from New Guinea. The material from West Irian is poorly annotated but both the dried specimens and in particular the micro-features correspond in all details with the type from eastern New Guinea.

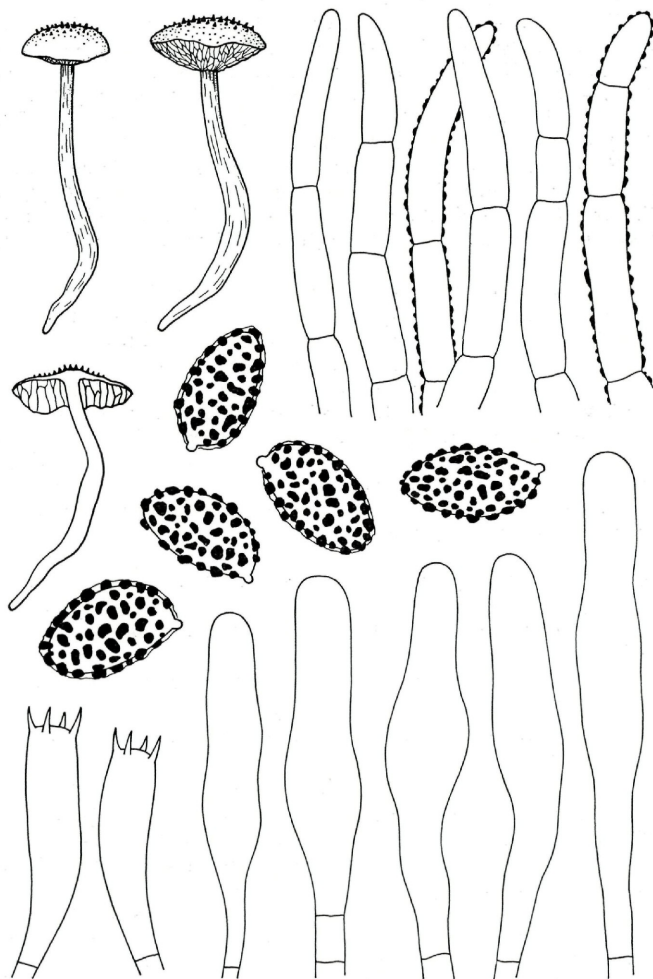
Due to the large, alveolate or lamelloid pores this small and inconspicuous bolete very much resembles *Phylloporus* QUÉLET (1888). But the microscopic characters demonstrate convincingly that there are no apparent relationships towards this genus.

Austroboletus latitubulosus, however, is closely allied to *A. shichiannus* (TENG & LING) which is reported from the Chinese province Chekiang. In addition the Congolese *A. purpurascens* (HEINEMANN) is also considered to be related to the two before mentioned taxa. This opinion is not only well supported by my own comparative SEM-micrographs of the spores but also by the observations published by PERREAU—BERTRAND (1961: 458).

9. *Austroboletus novaezelandiae* (McNABB) WOLFE 1979 — Pl. 4, A

Bibl. Mycol. 69: 115

Bas. *Porphyrellus novaezelandiae* McNABB 1967: New Zealand J. Bot. 5: 536.



Pl. 3. *Austroboletus latitubulosus* HORÁK (type): carpophores, basidia, cheilo- and pleurocystidia, cuticle

Illustrations. — McNABB (1967), PEGLER & YOUNG (1971), WOLFE (1979, except pleurocystidia in fig. 57!).

Material. — New Zealand: Auckland, Titirangi, Atkinson Park, 20. VI. 1965, leg. McNABB (PDD, 24627, holotype). — West-coast, Ahaura, Haupiri River, Kopara, 11. II. 1968, leg. HORAK (ZT, 68/74). — Same locality, 11. III. 1968, leg. HORAK (ZT, 68/131). — New Caledonia: Paita, Mt. Mou, 20. II. 1977, leg. HORAK (ZT, 77/15). — Same locality, 22. II. 1977, leg. HORAK (ZT, 77/31).

Habitat. — On soil in forests or on rotten organic debris. In New Zealand under *Leptospermum-Cyathea* (type) or *Nothofagus* (*N. fusca*, *N. menziesii*, *N. truncata*). In New Caledonia under *Nothofagus* spp. From sea level to 1300 m (New Caledonia). — New Zealand, New Caledonia.

Remarks. — The two New Caledonian collections agree in all essential features with the type from New Zealand except that the reddening of the context in the stipe is stronger (especially in the base).

Among all taxa in the *A. cookei*-group this species is by far the best known. *A. novaezealandiae* is undoubtedly closely related with *A. niveus* (New Zealand), *A. cookei* (Australia), *A. subvirens* (New Guinea, Japan) and *A. dictyotus* and its varieties (Indonesia, Sabah, Singapore, Malaysia). Unfortunately the microscopic data of these taxa are not available in all details. At present it is therefore impossible to propose the distinct limits for the convincing separation of these apparently intergrading species.

10. *Austroboletus purpurascens* (HEINEMANN) HORAK, comb. nov.

— Pl. 5, A

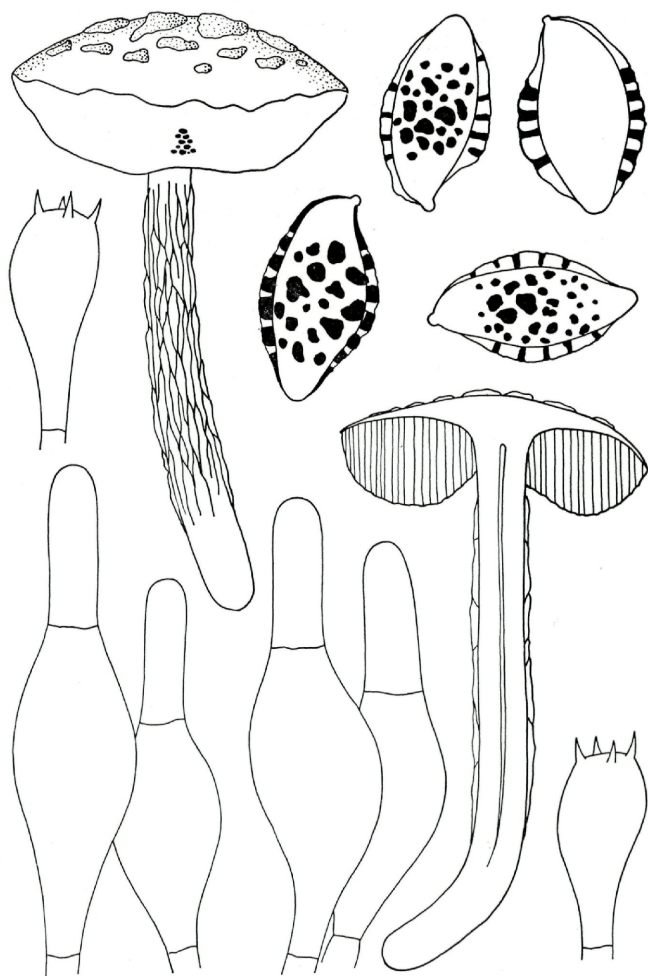
Bas. *Boletellus purpurascens* HEINEMANN 1951: Bull. Jard. Bot. Bruxelles 21: 298.

Illustrations. — HEINEMANN (1951; 1954), PERREAU-BERTRAND (1961).

Material. — ZAIRE: Binga, leg. M. GOOSSENS-FONTANA, 4031 (BR, holotype).

Habitat. — On soil in forests. — Zaire.

Remarks. — The reexamination of the type material yielded the following microscopic data: Spores $10-12 \times 5.5-6.5 \mu\text{m}$ (ornamentation up to $0.6 \mu\text{m}$ high), ellipsoid to amygdaliform, covered by coarse, isolated warts embedded in perispore, germ pore and suprahilar depression absent, yellowish (KOH). Basidia $22-30 \times 9-11 \mu\text{m}$, 4-spored. Cheilo- and pleurocystidia $35-40 \times 11-16 \mu\text{m}$, broadly fusoid, membrane thin-walled, dark brown (KOH) plasmatic pigment present. Cuticle a trichoderm of short-celled, cylindric hyphae ($5-14 \mu\text{m}$ diam.), terminal cells rounded, membranes encrusted by yellow (KOH) pigment. Clamp connections none.



Pl. 4. *Austroboletus novaezelandiae* (McNABB) WOLFE (ZT, 68/74): carpophores, spores, basidia, cheilo- and pleurocystidia

Within the generic concept of *Austroboletus* an homogenous (natural) section could be introduced which contains *A. purpurascens*, *A. latitubulosus* (New Guinea) and *A. shichianus* (China). The taxa united in this group have the following features in common: small carpophores; pileus tomentose to squamulose-scaly; stipe smooth; tubes-pores large, ochraceous to pale yellow-olive, subdecurrent on stipe; context cyanescent or not; spores ellipsoid to amygdaliform, yellow (KOH), coarsely warted; cuticular hyphae encrusted by pigment.

In a later addition HEINEMANN (1966) expressed his doubts about the taxonomic position of *Boletellus purpurascens*, and suggested that this bolet should be better accommodated in *Heimiella* BOEDIJN (1951). This opinion is not supported since the ornamentation of the spores does not indicate relationships to *Heimiella* at all.

11. *Austroboletus rarus* (CORNER) HORAK, comb. nov.

Bas. *Boletus rarus* CORNER 1972: *Boletus* in Malaysia, 87.

Illustrations. — CORNER (1972).

Material. — Singapore: Bukit Timah, 10. XII. 1940, leg. CORNER (s. n., Herb. CORNER, holotype).

Habitat. — On soil in forest. — Singapore.

Remarks. — To my opinion *A. rarus* (CORNER) is a well defined species which obviously can not be considered a mere variety of *A. rubiicolor* (CORNER). The spores of the former taxon are 14–19 × 7–8 μm (ornamentation up to 1 μm high). Regarding its relationships to *A. fusisporus* (KAW.) CORNER's observations are confirmed. The spores of this Japanese bolete are shorter, more conspicuously fusoid-mucronate and the warts are up to 2 μm high.

12. *Austroboletus rostrupii* (H. & P. SYDOW) HORAK, comb. nov.

— Pl. 5, B

Bas. *Boletus rostrupii* H. & P. SYDOW 1903: *Ann. Myc.* 1: 177.

(= *Boletus lacunosus* ROSTRUP 1902: *Bot. Tidskr.* 24: 357; ep. further homonyms under *A. cookei*).

Syn. *Austroboletus mucosus* (CORNER) WOLFE 1979: *Bibl. Mycol.* 69: 107.

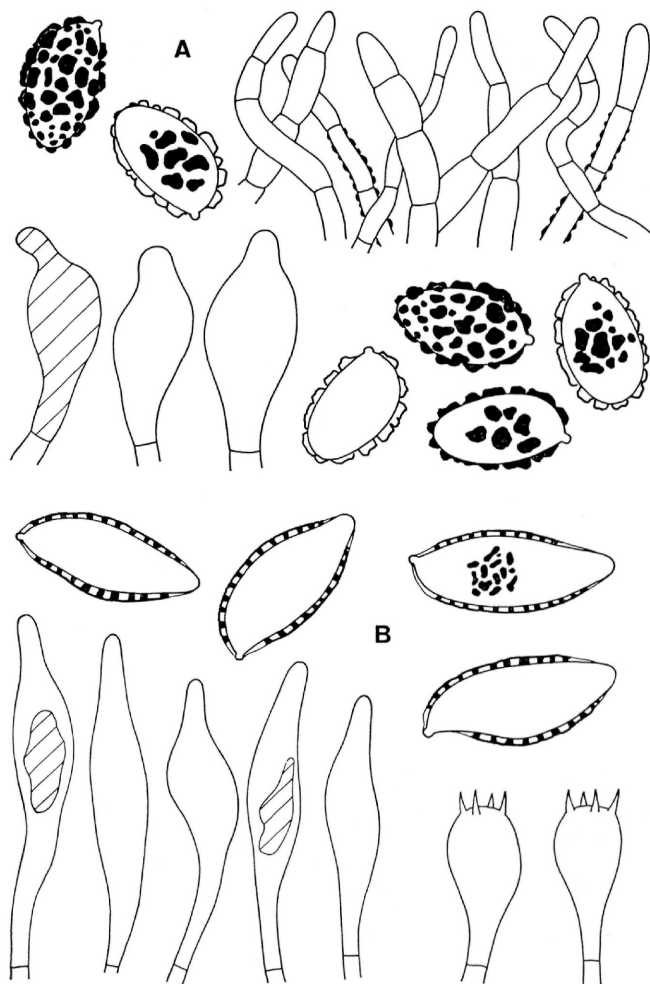
Bas. *Boletus mucosus* CORNER 1972: *Boletus* in Malaysia, 77.

Illustrations. — CORNER (1972), WOLFE (1979).

Material. — Thailand: leg. ROSTRUP, F. 579 (C, holotype). — Singapore: Reservoir Jungle, 28. III. 1930, leg. CORNER (Herb. CORNER, s. n., holotype of *Boletus mucosus*).

Habitat. — On rotten wood (type) or on soil in forests. — Thailand, Singapore.

Remarks. — The pickled type material of *A. rostrupii* is in good condition and the following microscopic data have been observed: Spores 15–18 × 6–7 μm (ornamentation up to 1 μm high), fusoid, suprahilar depression distinct, punctate-warted, perispore signi-



Pl. 5. A. *Austroboletus purpurascens* (HEINEMANN) HORAK (type): spores, cheilo- and pleurocystidia, cuticle. — B. *Austroboletus rostrupii* (H. & P. SYDOW) HORAK (type): spores, basidia, cheilo- and pleurocystidia

ficant, germ pore none, yellow (KOH). Basidia 25—30×8—10 μm , 4-spored. Cheilo- and pleurocystidia 40—65×8—10 μm , fusoid to cylindric-ventricose, membrane thin-walled, hyaline to yellowish, often with yellow, plasmatic pigment. Cuticle very glutinous, structure not examined (destroyed by conservation liquid). Clamp connections absent.

The microscopic and macroscopic characters of *A. rostrupii* coincide well with those reported for *B. mucosus* described by CORNER (1972) from Singapore. Hence the latter taxon has to be considered a later synonym of *A. rostrupii*.

13. *Austroboletus rubicolor* (CORNER) HORAK, comb. nov.

Bas. *Boletus rubicolor* CORNER 1972: *Boletus* in Malaysia, 86.

Illustrations. — Corner (1972).

Material. — Singapore: Bukit Timah, 19. VIII. 1939, leg. CORNER (s. n., Herb. CORNER, holotype).

Habitat. — On soil in forest. — Singapore.

Remarks. — According to shape, size and ornamentation of the spores (19—22×7—8.5 μm , warts up to 1 μm high) *A. rubicolor* is closely related both to *A. novaezelandiae* (MCNABB) and *A. cookei* (SACC. & SYD.). Examining the (pickled) type material I failed to recover the cystidia said to be "subventricose, attenuate to an obtuse apex, —70×12—18 μm ". Unfortunately in CORNER's original description no reference is made regarding the conspicuous septum (in the upper half of the cystidia) which is a typical character for the species related to the two above-mentioned, Australasian taxa.

14. *Austroboletus shichianus* (TENG & LING) HORAK, comb. nov.

Bas. *Boletus shichianus* TENG & LING 1932: *Contr. Biol. Lab. Science Soc. China* 8: 99.

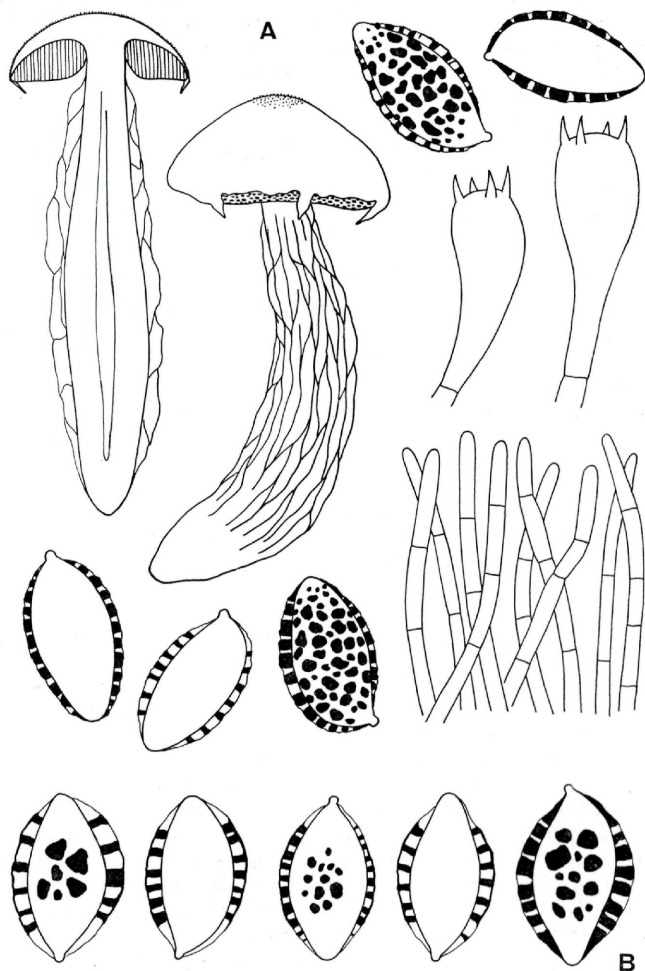
Syn. *Boletellus shichianus* (TENG & LING) LING 1964: *Fungi of China*, 759.

Illustrations. — TENG & LING (1932).

Since the original diagnosis is published in a little known journal the description is repeated herewith:

"Pileus carnosus, convexus, dein expansus, siccus, squamulosus, olivaceo-fulvus, usque ad 2 cm latus; stipite aequali, farcto, glabri ad sericeo-fibrilloso, concoloro, basi ochraceo-flavo; carne pallide tenui; tubulis adnatis, flavo-viridibus, poris magnis, angulatis, usque ad 2 mm diam.; sporis ochraceo-flavis, ellipsoideis ad subglobosis, saepe utrinque apiculatis, verruculosi, 1—2-guttulatis, 8—12×7—8.5 μ . On ground in woods, Tien-mu-shan, Chekiang, S. C. TENG, 1456, type, June 27, 1932".

Remarks. — Despite the lack of type material the transfer of *B. shichianus* to *Austroboletus* is proposed. This shift is backed up by



Pl. 6. A. *Austroboletus subvirens* (HONGO) WOLFE (ZT, 72/326): carpophores, spores, basidia, cuticle. — B. *Austroboletus fusisporus* (KAWAMURA ap. IMAZEKI & HONGO) WOLFE (type): spores

the fact that this species is a very close ally of *A. latitubulosus* HORAK (see above) from New Guinea. Both species have small, slender carpophores with large, alveolate pores. The context is not cyanescent and the two taxa share also the (for Boleti) unusual warted spores. The surface of the stipe is in both cases fibrillose and there are no veil remnants present.

For more information compare *A. purpurascens* (HEINEMANN).

15. *Austroboletus subvirens* (HONGO) WOLF 1979 — Pl. 6, A

Bibl. Myc. 69: 125

Bas. *Porphyrellus subvirens* HONGO 1960: Acta Phytotax. Geobot. 18: 110.

Illustrations. — HONGO (1960), WOLFE (1979).

Material. — Japan: Otsu, Kamidanakami-Shibahara, 12. IX. 1964, leg. HONGO, 2933 (ZT, 70/310). — Papua New Guinea: Morobe district: Bulolo, Manki, 1100 m, 13. X. 1971, leg. HORAK (ZT, 71/109). — Wau, McAdam National Park, 1400 m, 27. III. 1972, leg. HORAK (ZT, 72/326). — Bulolo, Gorge of Bulolo River, 1100 m, 17. XI. 1972, leg. HORAK (ZT, 72/637). — Bulolo, Manki, 1350 m, 18. XI. 1972, leg. HORAK (ZT, 72/642).

Habitat. — On soil, probably mycorrhiza-forming with Fagales. Under *Castanopsis*, *Quercus* and *Pinus* in Japan, under *Castanopsis* and *Lithocarpus* in Papua New Guinea.

Remarks. — In Papua New Guinea I came across *A. subvirens* (HONGO) for the first time and then I considered the material merely as a (colour) variety of *A. novaezelandiae* (MCNABB). After collecting and examining 3 other specimens it became clear that *A. subvirens* represents an independent species close to *A. novaezelandiae* which (to present knowledge) is associated only with trees of southern origin (*Leptospermum*, *Nothofagus*).

Usually the olive-green colour of the pileus is evident in young carpophores but disappears with the ageing of the fruitingbodies. During the drying process this colour can recur again on exsiccata.

It has to be emphasized that ecologically *A. subvirens* follows its mycorrhizal host plants (*Castanopsis*, *Quercus*, *Lithocarpus*) from Japan to New Guinea. Further records of this bolete can be safely expected in the whole area of distribution of these fagaceous trees (western Australasia, Indomalaya, China).

The similar spore morphology (SEM-micrographs) was leading WOLFE (1979) to the conclusion that *A. subvirens* is probably conspecific with *A. dictyotus* (BOEDIJN). I am also of that opinion (cp. discussion under *A. novaezelandiae*) but additional collections are needed to decide this question.

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Autor(en)/Author(s): Horak Egon

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