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***Austroboletus asper* K. Syme, Bonito, T. Lebel, Fechner & Halling, sp. nov.**

Etymology. *Asper* (rough), in reference to the ornamentation of the basidiospores.

Classification — *Boletaceae*, *Boletales*, *Agaricomycetes*.

Pileus 3.5–9.5(–22) cm broad when expanded, conico-convex to convex to plano-convex, rarely glutinous to viscid when young and fresh, becoming minutely areolate tomentose to matted tomentose and dry as gluten dissipates, often with a suede-like texture, with white, sterile appendiculate veil remnants, cinnamon brown to brown to cocoa brown (8A3,2; 7E8,7,6; 7D7,6; 6B3; 6C–D–E8,7,6,5; 5C6; Kornerup & Wanscher, 1983). *Flesh* white, unchanging, up to 2 cm deep, with mild *odour* and *taste*. *Tubes* depressed to deeply depressed around stipe, white when young, soon pinkish brown (8D4; 7C4), usually staining brown (6E8,7). *Stipe* 3.5–8(–12) cm long, 0.6–1.7(–3.4) cm broad, equal to subclavate, strict or curved, sometimes slightly tapered at base, alveolate to lacunose-reticulate, sometimes coarsely so, white above, occasionally pale yellowish, sometimes pale brownish below on reticulum when fresh, often yellow to brownish orange (5B7, 6C7) at base, especially with age, rarely viscid below when young and moist, otherwise dry, with interior white, unchanging, pithy to hollow with age, white or sometimes pale yellow in the base, with white rhizomorphs.

Spores (12.1–)14.3–18.7(–20) × 4.4–5.5 µm (av. = 16.23 × 4.92 µm, Q = 3.33, spores *n* = 159, specimens *n* = 8), faintly wrinkled to very finely and uniformly rugulose to irregularly granular (light microscope) or irregularly foveate with low, short meandering ridges and low, isolated tubercles (SEM), weakly dextrinoid in Melzer's. *Basidia* 29–36 × 6–11 µm, four-sterigmata, clavate, hyaline. *Tube trama* boletoid and divergent, inamyloid, with occasional laticiferous elements, with hyphae, 3.5–10 µm broad. *Hymenial cystidia* 50–60 × 12–20 µm, scattered, embedded in the hymenium with rostrate portion protruding, fusoid rostrate to ventricose rostrate with septum separating a broad rostrum from ventricose portion, hyaline, thin-walled, inamyloid. *Pileus trama* inamyloid, hyaline in KOH, with hyphae 5–8 µm broad. *Pileipellis* a tangled, erect, dense trichodermium, soon collapsing; hyphae with rare hyaline encrustations, hyaline or otherwise a pale ochraceous in KOH, 5–8 µm broad. *Stipitipellis* a tangled trichodermium of thin-walled, hyaline, soon collapsing hyphae, rarely with obvious end cells.

Habit, Habitat & Distribution — Solitary to gregarious on soil or sand with *Agonis flexuosa*, *Allocasuarina fraseriana*, *A. littoralis*, *Corymbia calophylla*, *Eucalyptus diversicolor*, *E. guilfoylei*, *E. marginata*, *E. pilularis*, *E. racemosa*, *Leptospermum* sp., *Lophostemon* sp., and *Syncarpia glomulifera*. At present, known in Queensland, Tasmania, Victoria, Western Australia.

Colour illustrations. Sclerophyll forest of *Eucalyptus diversicolor*, *Corymbia calophylla* and *Agonis flexuosa* near Denmark, Western Australia (photo K. Syme). *Habit* (*Syme 2828*, type); spores with DIC light microscope and with SEM; pileipellis; hymenial cystidium. Scale bars = 5 cm (*habit*), 5 µm (SEM), 10 µm (light micrographs).

Typus. AUSTRALIA, Western Australia, Denmark, 1874 South Coast Highway, SE section, S34.9861° E117.2876°, 5 May 2013, *K. Syme 2828* (holotype MEL2371703, isotype NY02072470, ITS and *rpb1* sequences GenBank KP242152 and KP242055, MycoBank MB836723).

Additional material examined. AUSTRALIA, Queensland, Tablelands, Davies Creek National Park, Davies Creek Road, 12.6 km from Kennedy Hwy, S17.0264° E145.6°, 680 m, 19 Feb. 1992, *Halling 6827* (PERTH, NY, LSU sequence GenBank KP242247); Wide Bay District, Great Sandy National Park, Fraser Island, near Lake Birrabreen, S25.4918° E153.054°, 108 m, 4 June 2009, *Halling 9159* (BRI, NY); Fraser Island, S25.4095° E153.086°, 112 m, 6 June 2009, *Halling 9172* (BRI, NY, LSU, *rpb1* and *rpb2* GenBank sequences MT921383, MT932084 and MT928122); Fraser Island, Cornwells Road near Kingfisher Bay, S25.4019° E153.031°, 94 m, 24 May 2010, *Halling 9362* (BRI, NY, ITS, *rpb1* and *rpb2* sequences GenBank KP242158, KP242047 and KP242087); Fraser Island, Northern Road, ± 1 km N of Cornwells Road, S25.4253° E153.059°, 100 m, 26 May 2010, *Halling 9393* (BRI, NY, *rpb1* sequence GenBank KP242057); Victoria, Colac Otway, Carlisle Sate Park, Cricket Pitch Track, 7.5 km W of Gellibrand, S38.5428° E143.477°, 170 m, 9 May 2005, *Halling 8685* (MEL, NY, ITS sequence GenBank KP242166); Western Australia, Denmark, off Sunny Glen Rd, state forest N of Plantagenet loc 6722, 6 June 1996, *Syme 877* (PERTH, ITS and *rpb2* sequences GenBank KP242218 and KP242111); adjoining Plantagenet loc 6721, S34.9315° E117.4435°, 6 May 1998, *Syme 955* (PERTH); Walpole-Nornalup National Park, The Knoll lower walk, S34.9938° E116.727°, 18 May 2001, *Syme 1139* (PERTH, MEL, LSU and ITS sequences GenBank KP242267 and KP242165).

Additional GenBank sequences. *rpb1*: KP242085; *rpb2*: KP242126, KP242127; ITS: KP242164, KP242173, KP242174, KP242186, KP242187, KP242204, KP242216

Notes — In Australia, there are other *Austroboletus* spp. with similar macromorphology, i.e., pileus colour, texture, and viscosity when fresh and moist. Degrees of separation are based on geographic distribution along with spore size and ornamentation. *Austroboletus occidentalis* appears to be restricted to Western Australia and has shorter, more citriform spores with similar, but coarser ornamentation and possesses a smooth plage (e.g., *Syme 2082*: PERTH8105421, NY02449690), a feature not noted in the protologue (Watling & Gregory 1986). Two other currently undescribed species (*Austroboletus* sp. 5, sp. 6) are only known from Queensland and tropical Northern Territory. A key feature of these latter is the asperulate spore ornamentation that can be difficult to see with a compound light microscope. However, with patience, high resolution optics equipped with Nomarski DIC lenses, a discrete ornamentation can be observed especially if the plage can be seen in adaxial and profile views.

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