

REMARKS ON HYGROPHORACEAE IN OR NEAR LAMINGTON NATIONAL PARK, SOUTH-EAST QUEENSLAND, AUSTRALIA

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Abstract

Five previously described species of Hygrophoraceae known to occur in the Lamington National Park of south-east Queensland are listed. Two new taxa, *Hygrocybe kouskosii* (subgenus *Pseudohygrocybe* Bon) and *Hygrocybe bagleyi* (subgenus *Humidicutis* Singer) are described.

Introduction

The Lamington National Park of south-east Queensland lies on a part of the Queensland-New South Wales border ranges which include the McPherson Range and the Lamington Plateau. The Park contains large areas of subtropical rainforest and a wide variety of other vegetational types including Antarctic beech forest, heath, wet eucalypt forest and dry, open eucalypt woodland. All parts of the park receive high rainfall (usually in excess of 2000 mm annually), so that the various vegetational types are defined by other factors such as temperature and soil type. In general, beech forests are restricted to the higher, cooler portions of the park while the subtropical rainforest occurs in the lower and warmer regions. Both forests are found on basaltic soils. The eucalypt woodlands and forests are found either on poorer rhyolitic soils or on the nutrient enriched zones between the basaltic and rhyolitic soils respectively. The high rainfall of the region and the various vegetational types, provide ideal conditions for fungi, and Hygrophoraceae are found in numerous locations within the Park. All collections cited in this paper were found on or near the walking tracks on the 'Binna Burra side' of the Park. More precise geographical details are sometimes held with the specimens; however, these are often lacking or are so inexact as to be valueless.

Collections and observations of Hygrophoraceae from the Lamington National Park indicate that species are to be found in subtropical rainforest, beech forest, eucalypt forest and heath. Supporting collections for some of these habitats have been omitted because their accompanying field notes do not allow species identification with certainty. No collections have been made from the Park's dry, open woodlands: the distance to these sites makes visits less frequent. In addition, these eucalypt woodlands are so dry that basidiomes of the Hygrophoraceae only appear under ideal climatic conditions and currently these conditions are impossible to predict. Observed substrata for Hygrophoraceae in the Lamington National Park include soil, litter and moss.

Materials and Methods

Macroscopical characters of basidiomes collected from the field were described and the basidiomes were then air-dried for later examination. Dried material was hydrated and examined in ammoniated Congo-red. Microscopic characters were drawn with an Olympus drawing tube. Twenty spores and ten basidia were selected at random to obtain the measurements cited in the descriptions. The derived parameter 'Q' is defined as the quotient of the length divided by the width of the relevant spore or basidium; the mean 'Q' is the quotient of the mean length and width respectively. A 10 mm scale bar is placed beside any habit drawings and a 10 µm scale bar is placed beside each drawing of a microcharacter. Since the intent of this paper for previously described taxa is only to provide verification of their presence within Lamington National Park, a full synonymy is not provided. Synonymy details may be obtained from Young (1999, 2000). For the new taxa, colour codes quoted are from Kernerup & Wanscher (1978). The author's collections are cited with the relevant personal herbarium number (*hb. young*) for reference purposes. Apart from the newly described taxa, the species listed here represent extremely well known and defined taxa for Australia and confirmatory descriptive details are not considered necessary. *Hb. Young* numbers are supplied for reference only. All material has been deposited at the relevant herbarium: BRI (Queensland Herbarium, Brisbane Botanic Gardens, Mt Coot-tha, Queensland) and BRIP (Plant Pathology Herbarium, Department of Primary Industries, Indooroopilly, Queensland).

Species: information and descriptions

Hygrocybe astatogala (R. Heim) Heinem., *Bull. Jard. Bot. État* 33: 436 (1963).

Material examined: Queensland. Lamington National Park, 1.iv.1988, A.M. Young (*hb. young 1211*) (BRI).

Habitat and distribution: Amongst leaf litter on soil in subtropical rainforest.

Remarks: The material in this collection is sterile, but there is no doubt as to its identity. The collection's macrocharacters and microcharacters (apart from the spores) are consistent with known descriptions of this taxon (Young 1999, Young & Wood 1997). Further confirmation of the presence of the taxon in the Lamington National Park is contained in photographs by Mr N. Male which were made available to the author; unfortunately, no material was collected with the photographs.

Hygrocybe bagleyi A.M. Young, *sp. nov.*

Pileus 15–40 mm, cerasinus, convexus ad obtuso-conicus dein lato-conicus, glaber, siccus, cum marginem crenulatus vel fissuratus. Lamellae lato-adnatae, olivaceo-virideae, distantes. Stipes 35–60 × 2–4.5 mm, pallido-cerasinus, glaber, siccus, cylindricus, cavus. Sporae 6–7.5 (–8) × 4–5.5 µm, mean 6.7 × 4.8 µm, Q: 1.3–1.6, mean Q: 1.42, ellipsoideae, hyalinae. Basidia 38–52 × 6–8.5 µm, mean 45.2 × 7.6 µm, Q: 5.1–6.9, mean Q: 5.99, 4-spora, fibulata. Cystidia nulla. Trama hymenophoralis regularis, fibulata rara vel nulla. Epicutis pilei cutem formans, fibulata rara vel nulla. Gregaria in pascuum.

Holotypus: Queensland. Binna Burra, 7.v.2000, A.M. Young (*hb. young 2289*) (holotypus BRI, hic designatus).

Pileus 15–40 mm, cherry-red (12B8–12B4) becoming sooty-red (12F5) with age over most of the pileus surface, convex to obtusely conical then expanding to broadly conical but depressed at the apex, smooth, dry, margin finely crenulate and splitting or eroding at maturity. *Lamellae* very broadly adnate and usually with a small decurrent tooth but sometimes sinuately notched at the stipe, at first light olive-green (30B4) and may have buff tints (3A3) but becoming light to dark olive-green (near 30C5), distant, thick, margins even and concolorous. *Stipe* 35–60 × 2–4.5 mm, pallid cherry-red (12A2–12B2) fading with age and at maturity may show greenish tints (28C2–28C3), smooth, dry, cylindrical, hollow, sometimes sinuous. (Figure 1.)

Spores 6–7.5 (–8) × 4–5.5 µm, mean 6.7 × 4.8 µm, Q: 1.3–1.6, mean Q: 1.42, ellipsoidal, hyaline, smooth, often with a large colourless inclusion. *Basidia* 38–52 × 6–8.5 µm, mean 45.2 × 7.6 µm, Q: 5.1–6.9, mean Q: 5.99, 4-spored, clamps present and usually of medallion form. *Cystidia* absent. *Hymenophoral trama* regular and consisting of globose, ellipsoidal, fusiform and cylindrical elements which are hyaline, inflated, thin-walled, septate 17–102 × 5.5–28 µm, clamps absent. *Pileipellis* a cutis of repent, cylindrical, thin-walled, septate hyphae 1–8 µm diam., often pigment encrusted, clamps absent. *Stipitipellis* a cutis of repent, cylindrical, thin-walled, septate hyphae 2–4.5 µm diam., often pigment encrusted, clamps absent.



Figure 1. *Hygrocybe bagleyi*. A. habit sketch and transverse section, bar = 10 mm; B. spores, bar = 10 µm; C. basidia, bar = 10 µm.

Habitat and distribution: Gregarious in lawn of introduced 'kikuyu grass' (*Pennisetum clandestinum* Hochst. ex Chiov.). Known only from the holotype locality of the lawns within the garden area of Binna Burra Mountain Lodge.

Material examined: Queensland. Binna Burra, 7.v.2000, A.M. Young (hb. young 2289) (BRI).

Remarks: The absence of clamps throughout the basidiome, except at the bases of the basidia where they are usually of medallion form, indicates that *Hygrocybe bagleyi* belongs in subgenus *Humidicutis* Singer. The world distribution of species within this subgenus appears to show that apart from one or two taxa in North America, most species within this subgenus are to be found in the Southern Hemisphere, centred on Australia and New Zealand. There are no European taxa within subgenus *Humidicutis* (D. Boertmann pers. comm.). No Australian or New Zealand species has the macrocharacters exhibited in *H. bagleyi* and the sole North American taxon, *Hygrophorus marginatus* Peck, has bright orange lamellae (author's personal investigations).

Etymology: Named after Mr L. Bagley of Binna Burra, Queensland.

Hygrocybe graminicolor (E. Horak) T. May & A.E. Wood, *Mycotaxon* 54: 148 (1995).

Material examined: Queensland. Lamington National Park, 1.iv.1988, A.M. Young hb. young 1208; BRI; Queensland. Lamington National Park, 17.ii.1990, A.M. Young (hb. young 1508; BRIP 23016); Lamington National Park, 30.iii.1996, A.M. Young (hb. young 1804) (BRI).

Habitat and distribution: Usually gregarious, but sometimes solitary on soil amongst litter or on deep humus in rainforest.

Remarks: Rain-washed basidiomes of *Hygrocybe graminicolor* can sometimes be confusing as they may appear pale pinkish instead of the usual green colorations.

Hygrocybe kouskosii A.M. Young, *sp. nov.*

Pileus 15–30 mm, atro-brunneus, conicus dein umbonatus, glaber, humidus vel siccus nunquam viscidus, cum marginem sub-striatus. Lamellae adnatae, distantes, albae dein sub-bubalinae. Stipes 15–40 × 4–7.5 mm, luteus, glaber, siccus, cavus, cylindricus. Sporae 8–11.5 × 5–7.5 µm, mean 9.8 × 5.8 µm, Q: 1.3–2.0 (–2.3), mean Q: 1.69, lato-ellipsoideae ad cylindricae vel obovoideae ad ovoideae, hyalinae, aliquot sub-constrictae ad constrictae, saepe spinae ad 3 µm longae. Basidia (41–) 46–63 × (6–) 7–9.5 µm, mean 54.1 × 8.0 µm, Q: 5.1–7.9

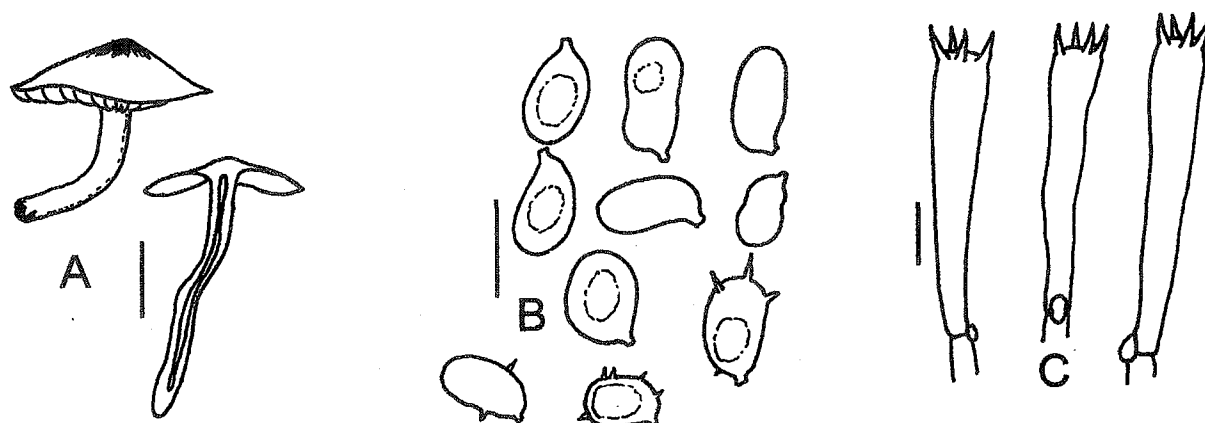


Figure 2. *Hygrocybe kouskosii*. A. habit sketch and transverse section, bar = 10 mm; B. spores, bar = 10 µm; C. basidia, bar = 10 µm.



Plate 1. Basidiomes of *Hygrocybe kouskosii* amongst soil on a moss bank. The brilliant yellow stipes and dark brown pilei are readily visible.

Habitat and known distribution: Gregarious on soil in moss bank, subtropical rainforest. Known only from the holotype locality.

Material examined: Queensland. Lamington National Park, 26.vi.1997, A.M. Young (hb. young 1945) (BRI).

Remarks: No other taxon has the colouration of dark-brown pilei, white lamellae and bright yellow stipe together with the development of spinose or echinate spores that occur in this species. The spinose spores are quite plentiful in the holotype material, but further collections will be required to see if this is a consistent property. Spinose spores intermingled with regular spores are so far known from two other taxa: the Australian *Hygrocybe anomala* A.M. Young and the European species *H. insipida* (J.E. Lange) M.M. Moser, neither of which exhibit this new taxon's macrocharacters: *H. anomala* has a convex pileus and a red or orange stipe, while *H. insipida* is orange on cap and stipe and has an ixotrichoderm on the pileus. *Hygrocybe kouskosii* belongs in subgenus *Pseudohygrocybe*.

Etymology: Named after Mr Gus Kouskos, forestry worker and overseer of the Lamington National Park during the period 1937–1966.

(–8.9), mean Q: 6.73, 4-spore, fibulata. Cystidia nulla. Trama hymenophoralis regularis, fibulata. Epicutis pilei cutem formans. Gregaria in musco sylvestri.

Holotypus: Queensland. Lamington National Park, 26.v.1997, A.M. Young (hb. young 1945) (holotypus BRI, hic designatus).

Pileus 15–30 mm, dark brown (5D4–5D5), conical becoming umbonate, smooth, moist to dry but not viscid, margins even or a little crenate when expanded and may be slightly striate and often are repand with age. **Lamellae** adnate, distant, thick, pure white and then faintly buff-tinted (4A2–4A3) with age, margins even and concolorous. **Stipe** 15–40 × 4–7.5 mm, yellow (3A4–3A5) and darker apically, smooth, dry, hollow, cylindrical, tending to split longitudinally. (Plate 1, Figure 2.)

Spores 8–11.5 × 5–7.5 µm, mean 9.8 × 5.8 µm, Q: 1.3–2.0 (–2.3), mean Q: 1.69, broadly ellipsoidal to cylindrical or obovoid to ovoid, smooth or frequently with spinose projections up to 3 µm long, hyaline, often with large colourless inclusions; cylindrical spores sometimes constricted. **Basidia** (41–) 46–63 × (6–) 7–9.5 µm, mean 54.1 × 8.0 µm, Q: 5.1–7.9 (–8.9), mean Q: 6.73, 4-spored, clamps present. **Cystidia** absent. **Hymenophoral trama** regular and consisting of globose, ellipsoidal, fusiform or cylindrical, inflated, hyaline, thin-walled elements 42–160 × 7–42 µm, clamps abundant. **Pileipellis** a cutis of repent, parallel, hyaline, thin-walled, cylindrical, septate hyphae 2.5–7 µm diam., clamps abundant; narrow cuticular hyphae sometimes with clavate apices up to 7 µm diam. **Stipitipellis** a cutis of repent, parallel, hyaline, thin-walled, cylindrical, septate hyphae 3–8 µm diam., clamps abundant.

Hygrocybe mavis (G. Stev.) E. Horak, *New Zealand J. Bot.* 9: 434 (1971).

Material examined: Queensland. Lamington National Park, 1.iv.1988, A.M. Young (hb. young 1214; BRI); Lamington National Park, 1.iv.1995, A.M. Young (hb. young 1717) (BRI).

Habitat and known distribution: Singly on soil amongst litter in subtropical rainforest.

Remarks: The pure white, dry basidiomes of *Hygrocybe mavis* are quite common in early autumn.

Hygrocybe miniata (Fr. : Fr.) P. Kumm., *Führer Pilzk.* 112 (1871).

Material examined: Queensland. Lamington National Park, 17.ii.1990, A.M. Young (hb. young 1511) (BRIP 23024); Lamington National Park, 15.ii.1992, A.M. Young (hb. young 1637) (BRI).

Habitat and known distribution: Gregarious to caespitose in leaf mould in subtropical rainforest.

Remarks: This taxon appears regularly in previously known locations where its brilliant red basidiomes form spectacular groups on the forest floor. One location near the start of the Dave's Creek track has produced fruiting bodies for several years in succession.

Hygrophorus involutus G. Stev., *Kew Bull.* 16: 373 (1962),

Material examined: Queensland. Lamington National Park, 18.iii.2000, A.M. Young (hb. young 2288) (BRI).

Habitat and known distribution: Caespitose on soil amongst litter in subtropical rainforest.

Remarks: This collection is the first record of this taxon for Queensland and its discovery was noted briefly in Young *et al.* (2000). The Lamington National Park material comprised a small cluster of basidiomes amongst litter at the foot of a hoop pine (*Araucaria cunninghamii* Aiton ex D. Don) in subtropical rainforest. *Hygrophorus involutus* is now known from New Zealand, Tasmania and the Australian mainland where the distribution includes Queensland, New South Wales and Western Australia; collections of what are believed to be *H. involutus* are held by the National Herbarium of Victoria and are yet to be confirmed, but anecdotal evidence suggests very strongly that the species is present in Victoria. The wide and disjoint distribution displayed by *Hygrophorus involutus* implies that its origins are ancient and are probably linked to the cool temperate forests that once covered much of southern Australia.

Acknowledgements

The kindness of Mr Linus Bagley, Manager Binna Burra Tourist Chalet and his wife Mrs Vanessa Bagley, in providing both facilities and help with access to the Lamington National Park is gratefully acknowledged. Mr N. Male is also thanked for his provision of a number of photographic slides of fungi from the Lamington National Park. This work was completed during part of a project funded by the Australian Biological Resources Study (ABRS).

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