

Marasmius vagus



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***Marasmius vagus* Guard, M.D. Barrett & Farid, sp. nov.**

Etymology. The Latin epithet *vagus*, wandering, refers to its widespread distribution in diverse habitats over a large area of monsoon tropical Australia, and its apparent recent dispersal and establishment in Florida, USA.

Classification — *Marasmiaceae*, *Agaricales*, *Agaricomycetes*.

Basidiomata small to medium sized, collybioid. **Pileus** 10–40(–50) mm, initially hemispherical, convex, becoming plane at maturity, apricot (47; Flora of British fungi chart 1969), sometimes paler orange (48) margin, and darker sienna (11) centre, dry, smooth to finely matt, margin entire, not in-rolled. Pileus colours display much variation depending on weather, tending to wash out in rain, and increase in intensity in dry weather. Flesh thin, white. **Lamellae** white, margins white or concolourous with pileus, free to adnexed, close, 18–22, 3–4 mm deep, with 2–3 series of lamellulae, very fine shallow cross-anastomoses, mostly in outer half of cap, and not always present in juveniles. **Stipe** central, cartilaginous, 30–55 × 3–5 mm, white to cream full length of stipe, or occasionally yellowish brown lower half, smooth, hollow, cylindrical, sometimes bi-tubular; basal hyphae forming a white tuft. **Spore print** white. **Basidiospores** variable between collections, with holotype at lower end of range, (8.5–) 9–10.5(–11.5) × (4.8–)5–6(–6.8) μm (av. 10 × 5.5 μm, Q = 1.47–2.04, Q_m = 1.76 ± 0.13, n = 50, s = 5 specimens), slightly curved ellipsoid to elongate, hyaline, inamyloid, with some granular contents. **Basidia** 22–30 × 8–9.5 μm, sterigmata short, rounded, 2–2.5 μm, 2–4-spored. **Basidioles** 22–23 × 5–8 μm, clavate. **Cheilocystidia** common, *Siccus*-type broom cells, with short to very long apical divergent projections, main body 9–20 × 4–11 μm, digits 4–12 × 1–2 μm, with 2–4(–8) digits, mostly thin-walled, with body also thin-walled except for outer 1/4 at base of projections; narrowly to broadly and irregularly cylindrical, clavate, occasionally branched; rare smooth, mucronate cheilocystidia also found, 24 × 8 μm. **Pleurocystidia** absent. **Pileipellis** consists of a hymeniderm of *Siccus*-type broom cells, main body 6–19(–27) × 3.5–10.5 μm, digits 2.5–11.5 × 1–2 μm, broadly clavate, cylindrical, ± branching with sparse to common digits, usually thin-walled at base, often thick-walled and refractive in upper two-thirds, and including the digits, which may be bifid; pileal hyphae 2.5–7 μm. **Caulocystidia** absent. **Stipitipellis** of parallel hyphae, 4.5–10 μm diam. **Clamp connections** present in all tissues. Melzer's reaction – pileal and lamellar trama inamyloid, stipe trama mildly dextrinoid.

Habit, Habitat & Distribution — Gregarious in habit and at times caespitose, it may also fruit in rings. A terrestrial saprotroph in accumulated leaf litter, the natural habitat in undisturbed sites varies from shaded microsites in tropical savanna woodland, to grassland and margins of tropical rainforest across more than 2000 km of northern Australia. For approximately 10 yr it has also been found growing in suburban lawns and highly disturbed habitats in Florida, USA.

Colour illustrations. Typical monsoon tropical habitat, Charnley River Station, Western Australia (Photo credit M. Barrett). Basidiomata Queensland (holotype); cheilocystidia of *Siccus*-type broom cells and basidiospores; coloured lamellar margins and cross-venations; basidiomata Florida (Farid 944, USF 300000). Scale bars = 10 mm (other) and 5 μm (microstructures).

Typus. AUSTRALIA, Queensland, Mt Carbine, S16° 34'44.1" E145°11'13.7", in savanna grassland leaf litter, 7 Mar. 2018, F. Guard & S. McMullan-Fisher SMF3041 (holotype AQ1008080; ITS and LSU sequences GenBank MT117839 and MT110674, MycoBank MB833552).

Notes — *Marasmius vagus* is characterised by a small to medium, orange to apricot, smooth pileus, close gills with cross-anastomoses and an all-white or pale cartilaginous stipe. These characters, with cheilocystidia of *Siccus*-type broom cells, in the absence of pleurocystidia and caulocystidia and a well-developed, non-collariate, non-instititious stipe place this species in sect. *Globulares* (group *Sicci*) subsect. *Siccini* ser. *Leonini*.

Marasmius vagus is sister to a well-supported *M. hypochroides*/*M. vladimiri* clade. *Marasmius hypochroides* (Berkeley & Broome 1875) described from Sri Lanka, but found across southern Asia, forms more robust, darker basidiomes (30–60 mm) with longer stipes (40–100 mm) that have dark reddish brown bases. *Marasmius vladimiri* (Crous et al. 2014) from India, is brighter in colour (orange scarlet with orange chestnut disc), has a coloured stipe with slightly shorter spores and larger basidia (36–40 μm). *Marasmius vagus* also bears a superficial resemblance to the Australian species *Marasmius elegans* (Grgurinovic 1997) that has bicoloured stipes (white above, brown below) and lacks cross-anastomoses in the lamellae. Our analyses of ITS data show that *M. elegans* and *M. vagus* are not genetically closely related.

Marasmius vagus is native to northern Australia where it is widely distributed amongst native vegetation in the monsoon tropics; it has been recorded there for more than 20 yr. However, it has also been found in lawns in the tourist mecca, Cairns, and several other towns in southeast Queensland. In Florida this species has been collected almost exclusively in suburban lawns and highly disturbed habitats, with the oldest known observation (Mushroom Observer, Obs. 106057) from 2012, suggestive of a recent introduction to Florida, USA. There are no records that this species was collected by Florida mycologists from previous generations, such as William Murrill (1859–1957) (Weber 1961) or James Kimbrough (1934–2017) (Smith & Healy 2019).

Supplementary material

FP1091-1 Additional materials examined.

FP1091-2 Phylogenetic tree. Bayesian (MrBayes v. 3.2.6) 50 % majority-rule consensus tree of the ITS-nrDNA for a selection of *Marasmius* species. Thickened lines indicate PP support > 0.95.

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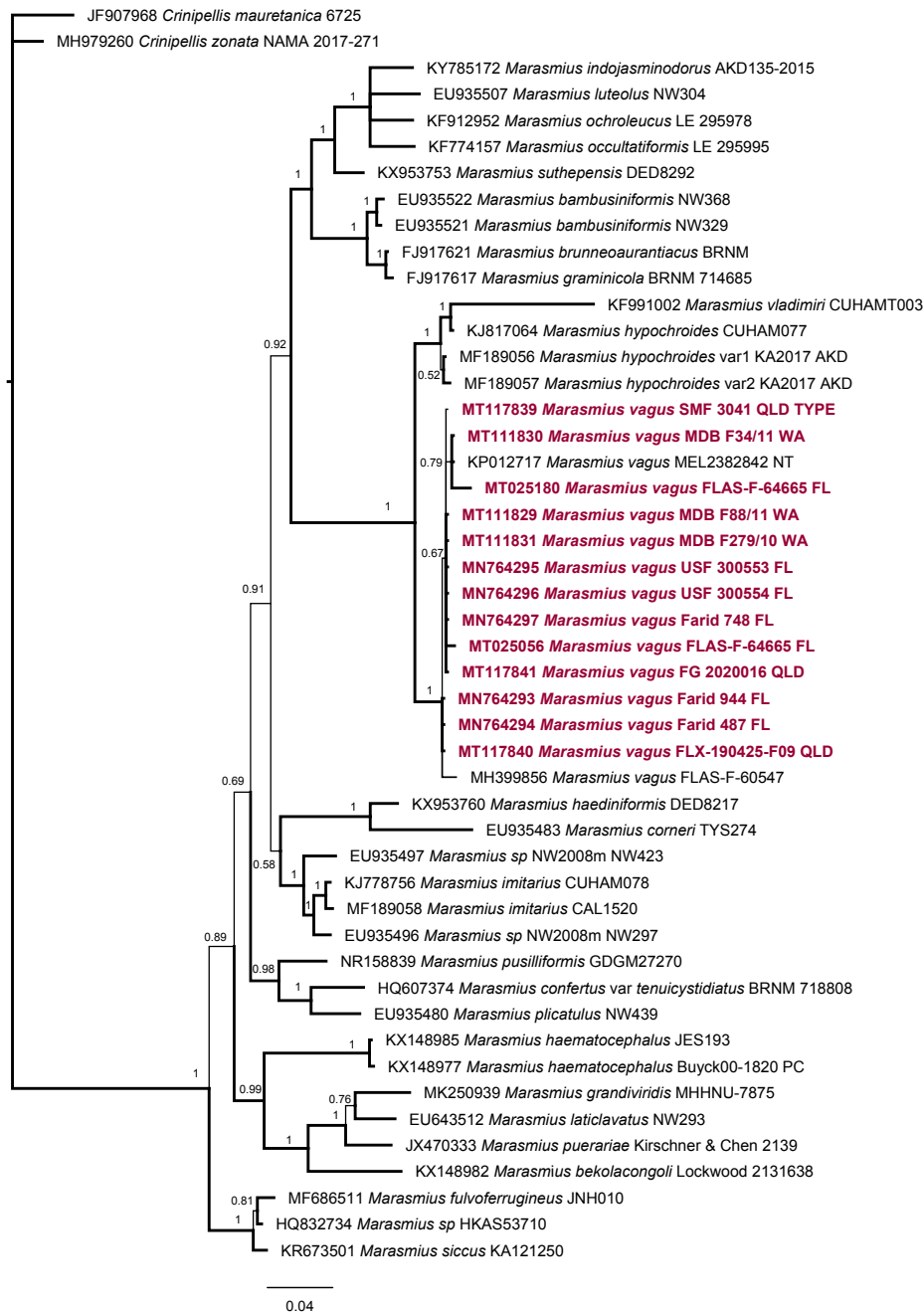
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FP1091-1 Additional materials examined.

Additional materials examined. AUSTRALIA, Queensland, Chillagoe, Mungara Caves, among leaf litter in deciduous vine thicket, 22 Feb. 2002, *P. Forster* & *A. Young* (AQ 553628); Sunshine Coast, Flaxton, in street-side lawn, 25 Apr. 2019, *V. Ryan* FLX-190425-F09 (BRI; ITS and LSU sequences GenBank MT117840 and MT110675); Mt Mee, Ocean View in grass on road verge, 27 Jan. 2020, *J. & C. Hunt* F2020016 (BRI; ITS and LSU sequences GenBank MT117841 and MT110676); Western Australia, Kimberley Region, Prince Regent River Reserve, in leaf litter amongst rocks in eucalypt woodland, 27 Jan. 2010, *M. Barrett* F279/10 (PERTH; ITS-LSU sequence GenBank MT111831); W.A., East Kimberley Region, south of Kununurra, in leaf litter on black soil plains, 11 Jan. 2011, *M. Barrett* F34/11 (PERTH; ITS-LSU sequence GenBank MT111830); W.A., east of Broome, on Great Northern Highway, in leaf litter in open pindan woodland, 15 Feb. 2011, *M. Barrett* F88/11 (PERTH; ITS-LSU sequence GenBank MT111829); Northern Territory, Darwin, Casuarina Coastal Reserve, in mulch at base of trees, 22 Jan. 2014, *T. Lebel et al.* GB495 (MEL 2382842, ITS-LSU sequence GenBank

KP012717). – USA, Florida, Hillsborough Co., Tampa, University of South Florida campus, lawn N of NES building, 10 Sept. 2016, *A. Farid* 487 (USF 300551; ITS sequence GenBank MN764294); *ibid.*, 10 Sept. 2017, *A. Farid* 748 (USF300552; ITS sequence GenBank MN764297); *ibid.*, 14 June 2019, *A. Farid* 944 (USF 300000; ITS sequence GenBank MN764293); Orange Co., Orlando, Orange County Extension Office, on lawn in Bermuda grass, 5 Aug. 2015, *J. Pelham* (MES-1444, FLAS-F-60547; ITS sequence GenBank MH399856); Audubon Park Covenant Church, in lawn, 15 July 2018, *J. Martin* (USF300553; ITS sequence GenBank MN764295); Polk Co., Winterhaven, near Simmers-Young Park, on suburban lawn, 26 Aug. 2017, *R. Praino* (MES-3007, FLAS-F-64665; ITS and LSU sequences GenBank MT025180 and MT025057); Sumter Co., near Sumterville, Coleman Low Correctional Facility, on lawn, 1 Nov. 2019, *L.J. Levine* (MES-3645, FLAS-F-64665; ITS and LSU sequences GenBank MT025056 and MT025179); Pasco Co., Holiday, in yard among grasses, 1 Aug. 2017, *J. Malka* 1 (USF 300554; ITS sequence GenBank MN764296).



FP1091-2 Phylogenetic tree. Bayesian (MrBayes v. 3.2.6) 50 % majority-rule consensus tree of the ITS-nrDNA for a selection of *Marasmius* species. Thickened lines indicate PP support > 0.95