Macalpinomyces mackinlayi
Macalpinomyces mackinlayi McTaggart & R.G. Shivas, sp. nov.

Sori in nonnullis ovarii inflorescentiae, longe cylindrici, 10–35 × 1.0–1.5 µm, primo virides tum cinerei. Sporae globosae, subglobosae vel late ellipsoidae, 9–13 × 8–12 µm, luteobreunae; paries aequalis, dense opertus conicus spinius 1–2 µm altis. Cellulæ steriles in catervis irregularibus, cellulæ singulæae globosae, subglobosae, ellipsoidaeae, 5.5–10.0 × 4.5–8.0 µm, hyalinaeae; paries aequalis, ca. 0.3 µm, levis.

Etymology. Derived from the host epithet.

Sori in some ovaries of an inflorescence, hypertrophied, long-cylindrical, sometimes rounded, 10–35 × 1.0–1.5 mm wide, initially green becoming grey from the apex downwards, with reddish brown remnants about 2 mm long of the host pericarp at the apex, rupture longitudinally exposing the powdery spore mass mixed with sterile cells. Spores globose, subglobose or broadly ellipsoidal, 9–13 × 8–12 µm, yellowish brown; wall even, densely covered in conical spines 1–2 µm high. Sterile cells in large, loose, irregular groups; individual cells globose, subglobose, ellipsoidal or slightly irregular, 5.5–10.0 × 4.5–8.0 µm, hyaline; wall ca. 0.3 µm thick, smooth.

Notes — Macalpinomyces is a polyphyletic genus with many species referable to either Ustilago or Sporisorium1. Macalpinomyces is represented in Australia by 12 taxa2. Macalpinomyces mackinlayi is best placed in Macalpinomyces until the Ustilago-Sporisorium-Macalpinomyces genus complex is resolved. It lacks columellae, typically present in Sporisorium and has sterile cells, which are not a character of Ustilago. It is morphologically similar to other Macalpinomyces species that have sterile cells, hypertrophied soror derived from host material, and densely echinulate spores, e.g. M. arundinellasetosae, M. tubiformis and M. siamensis. Macalpinomyces mackinlayi occurs on Eulalia mackinlayi, which is only known from the Mitchell Plateau region in north-western Australia. Eight Sporisorium species have been recorded on Eulalia, seven of which destroy the entire inflorescence or all the spikelets in an inflorescence. Sporisorium triplicata has localised sori and can be distinguished from M. mackinlayi by the white sorus derived from fungal cells, the presence of spore balls and the verrucose rather than echinulate spores.

BLASTn results of the ITS sequence of Macalpinomyces mackinlayi (GU014817) had high identity to sequences of M. tristachyae on Loudetiosis chrysothrix (GenBank: AY740164, 96 % identical over 90 % query coverage), M. bursus (as Sporisorium bursum) on Themeda quadrivalvis (GenBank: AY740154, 94 % identical over 90 % query coverage), Ustilago trichophora on Echinochloa colona (GenBank: AY345009, 94 % identical over 83 % query coverage) and M. loutdetae on Loutedia flavida (GenBank: AY740151, 91 % identical over 90 % query coverage). Genomic DNA of M. mackinlayi (holotype) is stored in the Australian Biosecurity Bank (http://www.padil.gov.au/pbt/).

Analysis of the ITS region of Macalpinomyces mackinlayi and some closely related taxa from GenBank in an exhaustive parsimony search using PAUP v4.0b4 yielded one tree (TL = 696; CI = 0.838; RI = 0.552; RC = 0.462). Bootstrap values from 1000 replicates are shown above nodes and decay indices shown below nodes. The species described here is printed in bold face. The tree was rooted to Moesziomyces bullatus (GenBank DQ831012), a known outgroup of the Ustilago-Sporisorium-Macalpinomyces genus complex1. A maximum likelihood analysis resolved a similar tree topology, except M. mackinlayi was sister to the M. tristachyae clade. This tree highlights that Macalpinomyces is a non-monophyletic group.

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