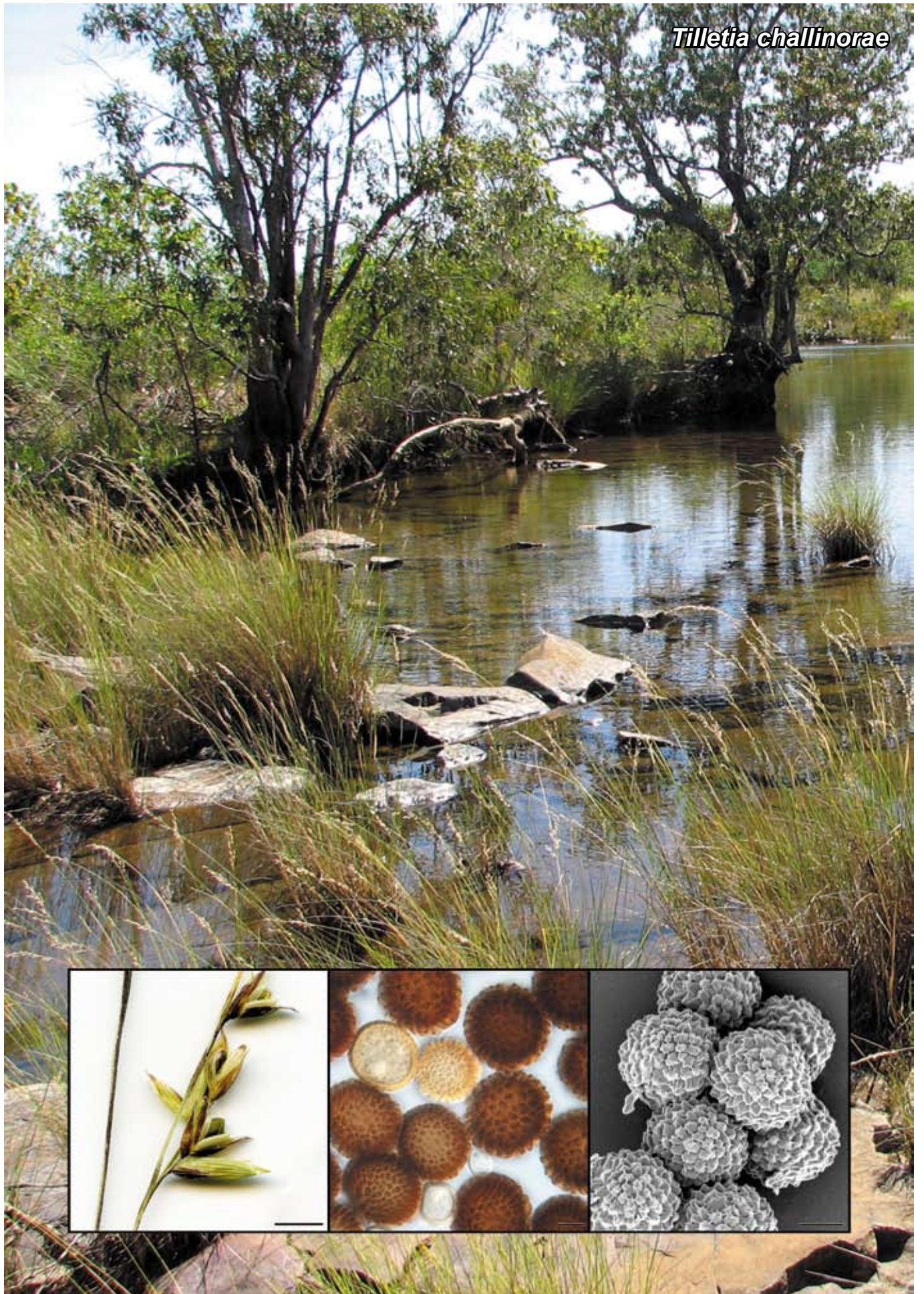


Tilletia challinorae



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***Tilletia challinorae* McTaggart & R.G. Shivas, sp. nov.**

Sporae globosae, subglobosae vel late ellipsoideae, 27–34 × 25–29 µm, altobrunneae, opaceae, verrucis acutatis, conicis, 3–4 µm altis et 3 µm latis, superficiali aspectu visae maculae irregulares, subpolyangulares, 10–15 µm per sporam diametro. Immaturae sporae globosae, cinnamomeae, 22–29 × 21–27 µm.

Etymology. Named after Victoria Louise Challinor, who discovered this and several other rare smut fungi.

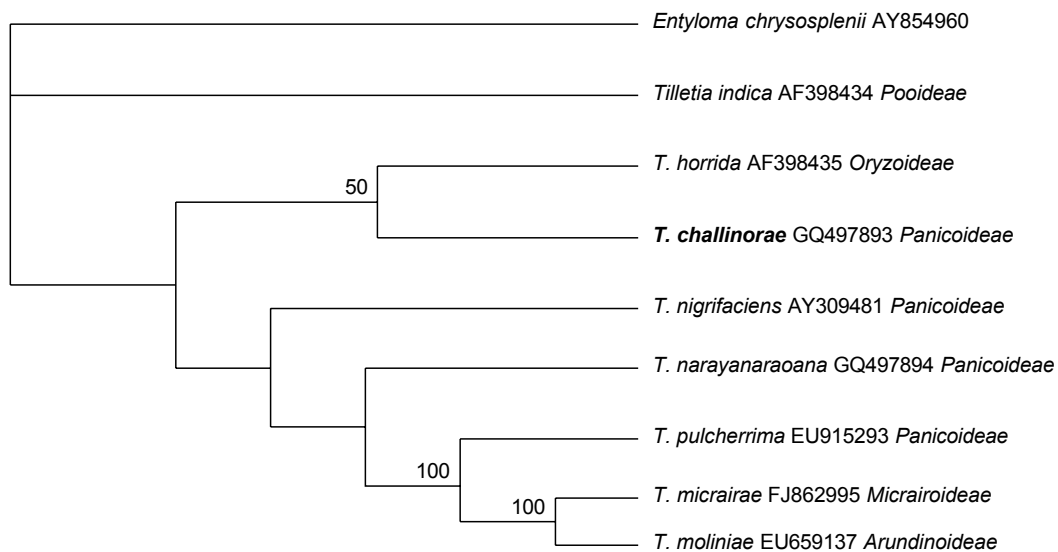
Sori in some slightly swollen ovaries of an inflorescence, protruding past the lemma, but shorter than the glumes, ovoid, 1.5–2.5 × 1.0 mm, covered by a peridium, initially green becoming dark brown, rupturing irregularly releasing the black, powdery spore mass mixed with sterile cells. *Spores* when mature globose, subglobose or broadly ellipsoidal, 27–34 × 25–29 µm, dark chestnut-brown, opaque, ornamented with acute conical warts, 3–4 µm high and 3 µm wide at base, 10–15 per spore diam, in surface view appearing as irregular subpolyangular spots. Immature spores pale brown, globose, 22–29 × 21–27 µm. *Sterile cells* globose, subglobose to broadly ellipsoidal, 14–26 × 13–23 µm, hyaline to sub-hyaline, pale yellow when larger; wall c. 1.0 µm thick, smooth to finely verruculose.

Typus. AUSTRALIA, Western Australia, Mitchell Plateau, Surveyor's Pool, 14° 40' 07" S, 125° 44' 25" E, *Panicum trachyrachis*, 12 May 2009, V.L. Challinor, A.R. McTaggart, M.J. Ryley, C.E. Gambley, T. Scharaschkin, M.D.E & R.G. Shivas, BRIP 52502, holotype, PERTH 07702639, isotype; ITS sequence GenBank GQ497893, MycoBank MB515157.

Notes — Thirty-eight species of *Tilletia* have been reported from Australia^{1,2,3} of which 14 are endemic to northern Australia. Worldwide, 12 species of *Tilletia* are known to occur on *Panicum*. One of these, *T. narayanaraoana* on *Panicum trachyrachis*, is known from Australia. *Tilletia challinorae* differs from *T. narayanaraoana* in having smaller sori, larger spores (*T. narayanaraoana* has spores 20–28 × 16–25 µm) with acute, single warts rather than blunt, agglutinated, filiform warts. Ten species of *Tilletia* occur as localised infections on *Panicum*. Of these, the most morphologically similar is *T. pulcherrima*, which has smaller spores (20–29.5 × 20–28 µm) that also differ in colour, ornamentation and the presence of a mucilaginous sheath surrounding the spores.

BLASTn results of the ITS sequence of *T. challinorae* had high identity to sequences of *T. horrida* on *Oryza sativa* (AF398435.1, 87 % identical over 97 % query coverage), *T. pulcherrima* on *Panicum virgatum* (EU915293.1, 91 % identical over 70 % query coverage) and *T. narayanaraoana* on *Panicum trachyrachis* (GQ497894, 87 % identical, over 90 % query coverage). Genomic DNA and cloned ITS plasmid of *T. challinorae* (holotype) are stored in the Australian Biosecurity Bank (<http://www.padil.gov.au/pbt/>).

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Majority-rule consensus tree (TL = 445; CI = 0.775; RI = 0.552; RC = 0.428) obtained using parsimony in an exhaustive search from an ITS sequence alignment using PAUP v4.0b10. The bootstrap support values from 1 000 replicates are shown at the nodes. The species described here is printed in **bold face**. The tree was rooted to *Entyloma chrysosplenii* (GenBank AY854960). There is little statistical support for this tree, but it serves to show that *T. challinorae* is more closely related to species of *Tilletia* on grasses in the tribe *Panicoideae* than the tribe *Pooideae*, a host-pathogen relationship previously reported in a phylogenetic analysis of combined morphological and LSU sequence data⁴.

Colour illustrations. Creek at Surveyor's Pool, Mitchell Plateau, Western Australia; sori in ovaries of *Panicum trachyrachis*; mature (dark brown) and immature (pale brown) spores and sterile cells; spore wall seen in SEM. Scale bars (from left to right) = 2.5 mm, 10 µm, 10 µm.

References. ¹Ványk K, Shivas RG. 2008. Fungi of Australia: The smut fungi. ABRS, Canberra; CSIRO Publishing, Melbourne. ²Shivas RG, McTaggart AR. 2009. Three new species of *Tilletia* on native grasses from northern Australia. Australasian Plant Pathology 38: 128–131. ³Barrett MD, Barrett RL, Shivas RG, McTaggart AR. 2009. *Tilletia micrairae*. Fungal Planet 33, Persoonia 22: 170–171. ⁴Castlebury LA, Carris LM, Ványk K. 2005. Phylogenetic analysis of *Tilletia* and allied genera in order Tilletiales (Ustilaginomycetes; Exobasidiomycetidae) based on large subunit nuclear rDNA sequences. Mycologia 97: 888–900.

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