



<http://dx.doi.org/10.11646/zootaxa.3857.1.1>

<http://zoobank.org/urn:lsid:zoobank.org:pub:7B2F8F0F-8D4A-4981-A468-A801FB93FF52>

Nematodes from galls on Myrtaceae. VIII. *Fergusobia* from small galls on shoot buds, with descriptions of four new species

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Abstract

Small shoot bud galls induced by the *Fergusobia* (Nematoda: Neotylenchidae)/*Fergusonina* (Diptera: Fergusoninidae) mutualism occur on various *Eucalyptus* spp. Four new species of *Fergusobia*, collected from small shoot bud galls on *Eucalyptus camaldulensis*, *E. gomphocephala* and *E. leucoxylon*, are described. *Fergusobia gomphocephalae* Davies **n. sp.** is morphologically characterized by a combination of a small C-shaped parthenogenetic female with a variable, conoid tail, a small C-shaped infective female with a hemispherical tail tip, and an arcuate or J-shaped male with a broad tail, angular spicule and short peloderan bursa. *Fergusobia leucoxylonae* Davies **n. sp.** has a C-shaped parthenogenetic female with a conoid tail with a narrowly rounded tip, an arcuate infective female with a broadly rounded tail tip, and an almost straight to barely J-shaped male with angular (not heavily sclerotised) spicule and short bursa. *Fergusobia schmidtii* Davies & Bartholomaeus **n. sp.** has an arcuate to open C-shaped parthenogenetic female with a relatively large body diameter, relatively long stylet and small tail with a broadly rounded tail tip, an open C-shaped infective female with a broadly rounded to hemispherical tail tip, and an arcuate to barely J-shaped male with spicules angular at about 33% of their length and peloderan bursa arising at about half body length. *Fergusobia sporangae* Davies **n. sp.** has an arcuate to open C-shaped parthenogenetic female with a relatively long stylet and a broadly rounded tail tip, an arcuate infective female with a short tail with a broadly rounded to hemispherical tip, and an arcuate to barely J-shaped male with angular (not heavily sclerotised) spicule and short peloderan bursa. Various forms of small shoot bud galls are described. From phylogenetic analyses based on sequences of the D2/D3 expansion segment of the large subunit rRNA gene, the four new species belong to two sister clades of *Fergusobia*. The larval shield morphology of their associated fly species and possible genetic relationships are discussed.

Key words: Myrtaceae, *Eucalyptus*, Neotylenchidae, *Fergusonina*, fly, Fergusoninidae, taxonomy, DNA sequencing, molecular phylogeny

Introduction

The *Fergusobia*/*Fergusonina* association is a mutualism (Currie, 1937; Giblin-Davis *et al.* 2001a; Taylor *et al.*, 2005; Davies *et al.* 2010a). Adult female flies carry second stage juvenile nematodes, which are deposited together with her eggs into meristematic host plant tissue. The nematodes begin feeding and developing, and gall tissue is produced, apparently via plant cell interactions with nematode saliva. The nematodes develop into at least one parthenogenetic generation within the gall, followed by an amphimictic generation. The males and females mate in the gall, and the inseminated female then penetrates into female fly larvae only (Scheffer *et al.*, 2013). Inside the

the respective fly larvae, this was surprising. A leaf PGER from *C. maculata* grouped with stem galls from *C. tessellaris* (F. Muell.) Hill & Johnson 1995, and shield form of the respective fly larvae plus host genetics supports this grouping. Scheffer found a final grouping of PGERs from *E. microcarpa*, *E. viminalis* and *E. melliodora*, from SA and the ACT. Flies associated with *F. schmidtii* n. sp., from the conoid multilocular axial bud gall on *E. camaldulensis*, came out in a clade with flies associated with *F. camaldulensae*, from multilocular axial ('stem') galls. Both have shields of the 'bars' form. This clade also included a FBGER from an unknown species of *Eucalyptus*.

Acknowledgements

We thank the Australian Biological Resources Survey for several grants providing partial funding of the work. Dr. Sonja Scheffer (USDA Baltimore) collected some of the small galls from leaf buds and their associated fly larvae now housed in the WINC, and gave us access to her data on the phylogeny of *Fergusonina*. In addition, this study was supported by the National Science Foundation (NSF) Tree of Life project (DEB 0228692) and USDA Special Grants in Tropical and Subtropical Agriculture (CRSR-99-34135-8478 and CRSR-03-34135-14078). We thank Jim Williams for preserving a eucalypt sapling to allow us to sample galls in the car park of the Erindale Shopping Centre, Adelaide, SA over an extended period.

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