Austropezia clade Pezizellaceae (Han Clade 3)

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Austropezia is amongst a macroscopically enigmatic group of New Zealand specimens that belong phylogenetically in Han et al. (2014) Clade 3 (Fig 1). The analyses of Johnston et al. (2019) and Ekanayaka et al. (2019) support Baral & Rämä (2015) in showing that Han Clade 3 forms a monophyletic clade separate to *Pezizellaceae* s.s. (= Han et al. Clade 2) and *Hamatocanthoscyphaceae* (= Han et al. Clade 1). Han Clade 3 as yet has no formal family name.

Han Clade 3 was included as part of *Pezizellaceae* by Baral (in Jaklitsch et al. 2016), Johnston et al. (2019), and Ekanayaka et al. (2019). Ekanayaka et al. (2019) split *Hamatocanthoscyphaceae* from *Pezizellaceae* sensu Johnston et al. (2019). Han Clade 2 is equivalent to the *Pezizellaceae* clade containing the type species of *Calycina*, *C. herbarum* (GenBank JN033407 ex KUS F52362), and is here treated as *Pezizellaceae* sensu stricto. Note that the type species of *Pezizella*, *P. sordida*, is accepted as a synonym of *Calycina vulgaris* (fide Species Fungorum), and based on GenBank data this species also belongs in *Pezizellaceae* s.s. (GenBank records for several genes ex TAAM 137756a).

Based on an ITS analysis (Fig. 2), Han Clade 3 includes the type species of *Austropezia*, *Calycellina*, *Rodwayella*, *Rubropezicula*, *Scleropezicula*, and *Zymochalara*. Note that specimens identified as the type species of *Rodwayella* (*R. sessilis*, Han Clade 3) is phylogentically distinct from '*Rodwayella*' *citrinula*, placed in Clade 9 by Han et al. (2014).

Several of the New Zealand taxa in Han Clade 3 have their immature apothecia covered by a clypeus-like layer, the mature apothecia erumpent through several irregular splits across the covering layer, while several other taxa have apothecia surrounded by a well-developed layer of subiculum-like hyphae (but phylogenetically distinct from *Arachnopezizaceae*). Spooner (1987) in his discussion on *Austropezia*/*Eriopezia*, compared the subiculum of some species with a loosely constructed stroma; perhaps a similar explanation could apply to the macro-morphological variation of the sterile tissue around the apothecia of these fungi. The only one of these New Zealand taxa with a name is *Austropezia samuelsii*. Those with a clypeus-like covering layer include D1327 'Leotiaceae crazy paving' (http://scd.landcareresearch.co.nz/Specimen/PDD_97323), D2488 'gen. nov. Chionochloa' (http://scd.landcareresearch.co.nz/Specimen/PDD_111531), and D 2518 http://scd.landcareresearch.co.nz/Specimen/PDD_92979 'on Phormium with clypeus' (Fig. 3).

Another *Phormium*-associated species from New Zealand (e.g. PDD 119511, http://scd.landcareresearch.co.nz/Specimen/PDD_119511) is morphologically similar to D2518.This species is similar to D 2518 (PDD 92979) in being associated with dead *Phormium* leaves and in having the immature apothecium covered with black clypeus. Ascospores are also similar in being elliptic to fusoid, radially symmetrical, 1-septate and surrounded by a gelatinous sheath. The species represented by PDD 119511 differs in having an amyloid ascus apex and a well-developed, hairy receptacle after the clypeus splits. In the species represented by PDD 92979 the excipular tissue is poorly developed following the clypeus splitting and the asci are not amyloid. Species matching PDD 119511 have no DNA sequence data available, but could be in the same clade as those in the Fig. 3 phylogeny below.

Other taxa in Clade 3 include the Han specimens *Mollisina uncinata* and *Phialina lachnobrachyoides* and the New Zealand specimen PDD 111525 (D1137; http://scd.landcareresearch.co.nz/Specimen/PDD_111525) , all with simple, pale-coloured discs, usually with poorly developed hair-like elements and little or no subiculum. These are superficially morphologically closer to *Calycina* (in Han Clade 2), but their phylogenetic position is well supported in both ITS and multigene phylogenies. *Mollisina uncinata* is described as arising from a black ring about the base (Raitviir, 2004), possibly the remains of what might have been a clypeus-like layer when immature. Raitviir (2004) also describes a brown basal ring for *Phialina* apothecia (perhaps relevant, perhaps not ...). The type species of *Phialina*, *P. deparcula*, is a synonym of *Calycellina ulmariae* (fide Species Fungorum) but it has no DNA sequence data available. Other genera such as *Scleropezicula* and *Rubropezicula* have no mention of a clypeus or subiculate hyphae in their descriptions.

Fig. 1. A screenshot from a multigene phylogeny incorporating taxa and specimens from Johnston et al. (2019) together with additional taxa with more recently available multi-gene data. Clades 1–3 from Han et al. (2014) indicated on right.

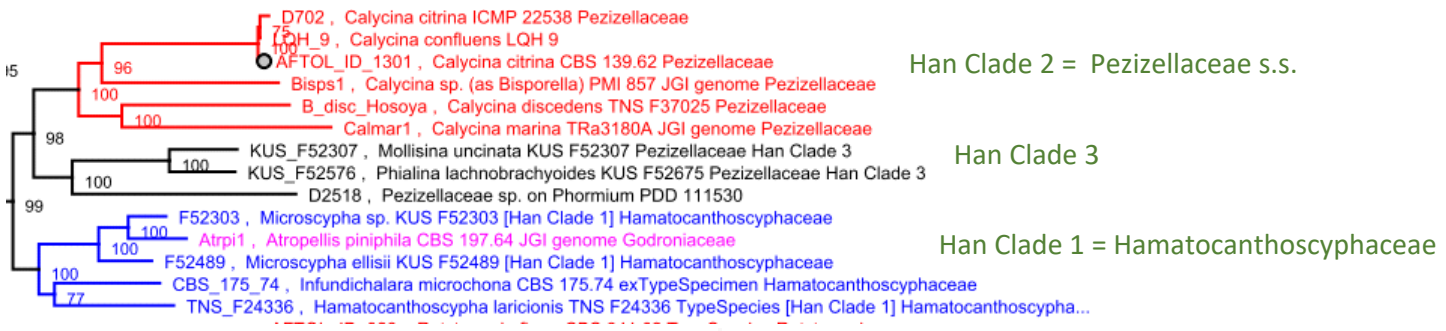
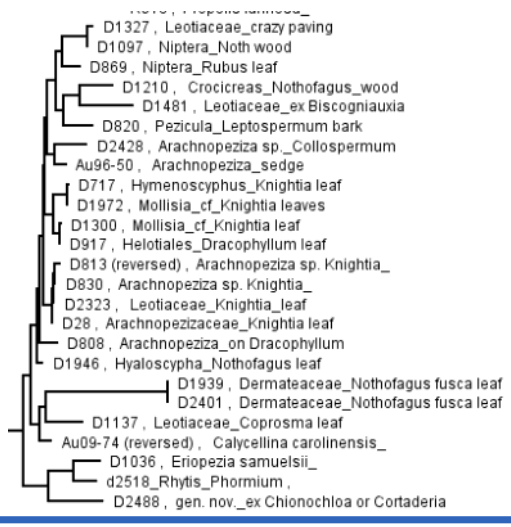


Fig. 2. ITS gene tree for taxa and specimens from Johnston et al. (2019, Fig. S2, additional file 6) together with additional, recently sequenced taxa and specimens matching Han Clade 3. A screenshot extracted from a Leotiomycete-wide ITS analysis.

Fig. 3. ITS gene tree with all NZ isolates in Clade 3



References

Baral, H-O.; Rämä, T. 2015. Morphological update on Calycina marina (Pezizellaceae, Helotiales, Leotiomycetes), a new combination for Laetinaevia marina. Botanica Marina 58: 523-534.

Ekanayaka AH, Hyde KD, Gentekaki E. McKenzie EHC, Zhao Q, Bulgakov TS, Camporesi E 2019: Preliminary classification of Leotiomycetes. Mycosphere 10: 310-489.

Han, J-G.; Hosoya, T.; Sung, G-H.; Shin, H-D. 2014: Phylogenetic reassessment of Hyaloscyphaceae sensu lato (Helotiales, Leotiomycetes) based on multigene analyses. Fungal Biology 118: 150-167.

Jaklitsch, W.; Baral, H-O.; Lucking, R.; Lumbsch, H.T. 2016: Syllabus of Plant Families.Stuttgart, Borntraeger Science Publishers. 322 p.

Johnston PR, Quijada L, Smith CA, Baral H-O, Hosoya T, Baschien C, Pärtel K, Zhuang W-Y, Haelewaters D, Park D, Carl S, López-Giráldez F, Wang Z, Townsend JP . 2019: A multigene phylogeny toward a new phylogenetic classification of Leotiomycetes. IMA Fungus 10(1): 1-22.

Raitviir, A. 2004: Revised synopsis of the Hyaloscyphaceae. Scripta Mycologica 20: 1-132.

Spooner, B.M. 1987: Helotiales of Australasia: Geoglossaceae, Orbiliaceae, Sclerotiniaceae, Hyaloscyphaceae.116 ed. Bibliotheca Mycologica 116: 1-711.