Mycological Notes 12: Blue & pink polypores, and Curtis Gates Lloyd (1859-1926).

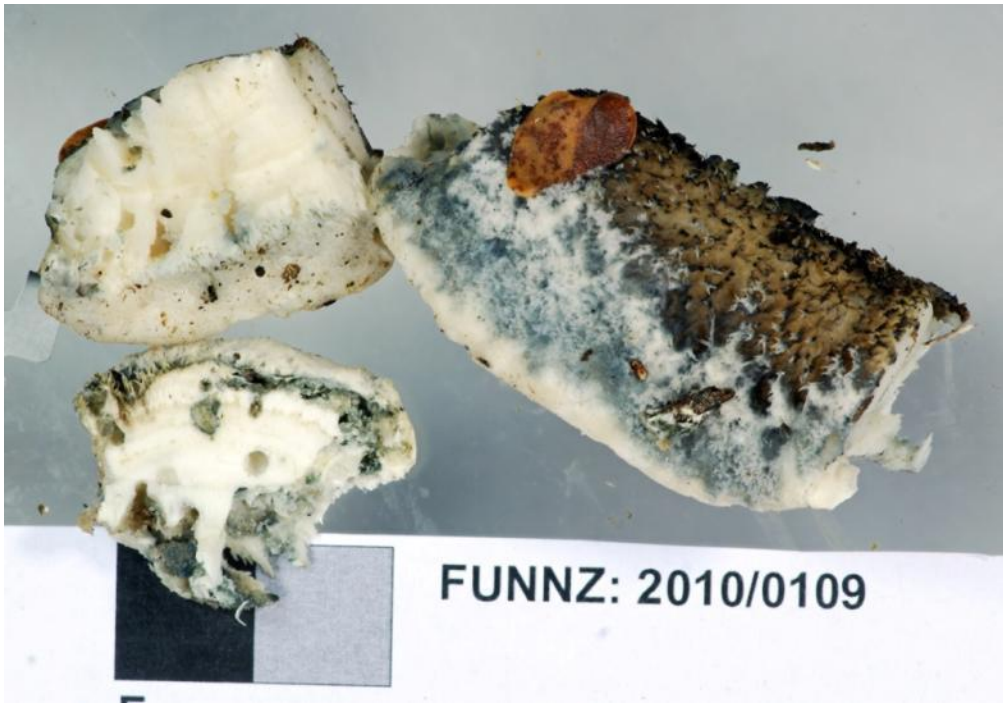
Jerry Cooper July, 2012

The three bracket fungi discussed here were collected on the 2010 foray and later sequenced. I mentioned them in my foray report for that year but it is worth expanding the details. I'm not a bracket person so some of this discussion is the result of an uninformed trawl through the literature. i.e. don't take it too academically.

Postia caesia - A Blue One

Postia caesia is a white polypore staining blue and I know it from the UK. It is reported as having a broad distribution, and so, as I mentioned in Notes 9, such claims ring alarm bells. I wondered if this *Postia caesia*-like fungus in the native beech forest really was the same as the one in the UK. What would a sequence tell us? As usual the story is complex.

Postia caesia



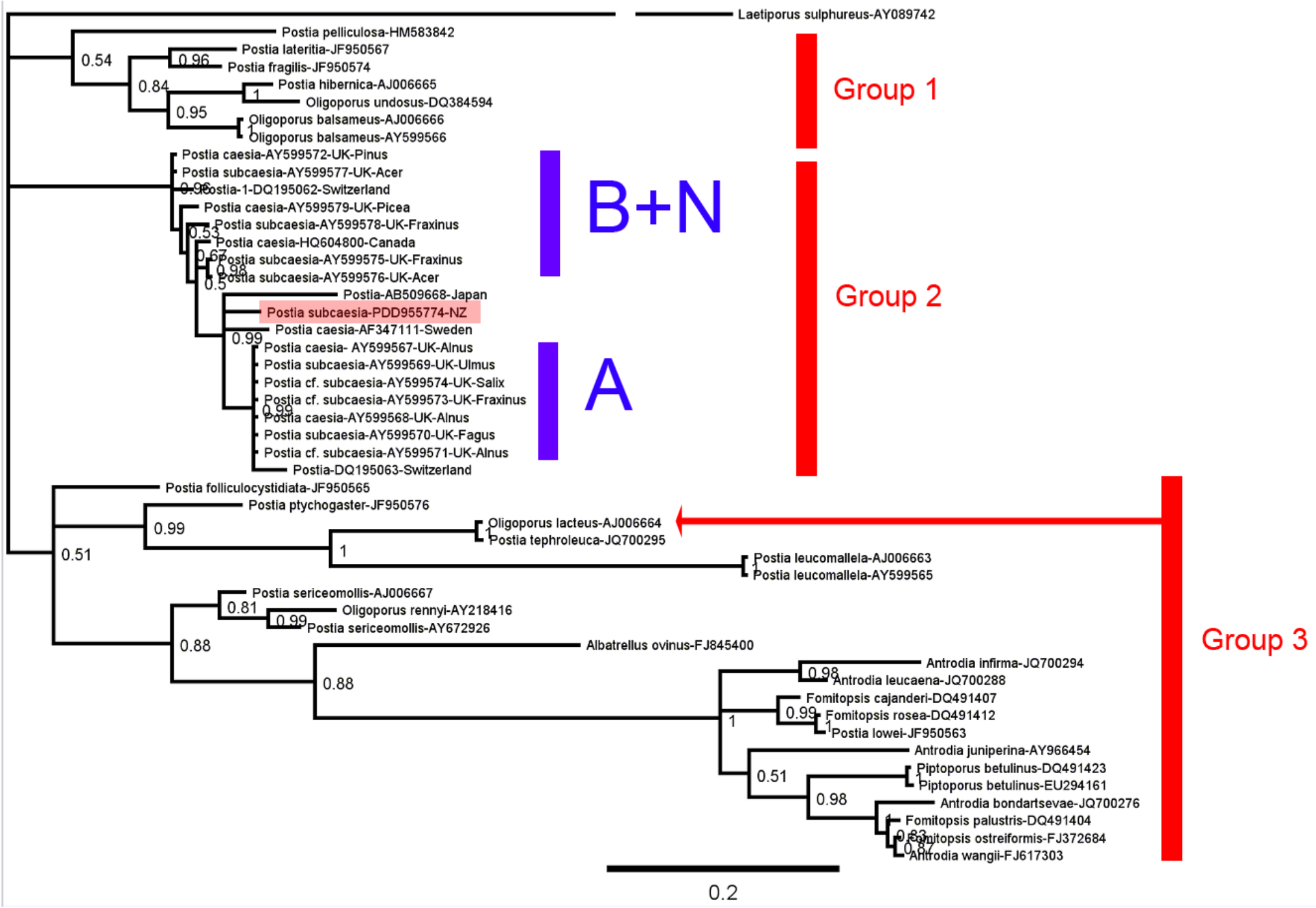
PDD 95774, on Mountain beech

Postia caesia has been variously placed in *Postia (*Type *P. lactea)*, *Oligoporus* (Type *O. farinosus* = *P. rennyi*) and *Tyromyces* (Type *T. chioneus)*. Molecular data suggest it resides within *Postia*, although Tura et al (2008) indicate it is still distant from core *Postia* species and suggest the possibility of reviving an old name *Cyanosporus* for the species. This genus was erected by Lloyd on his observation of *P. caesia* having a blue spore deposit, and observation which is not confirmed in modern descriptions.

There is an acknowledged species complex here (Yao et al, 2005). These authors sequenced a range of British material identified as *P. caesia* and *P. subcaesia* and found two clades which seemed to correspond with morphological differences (labelled A & B in the sequence tree). A has a tomentose pileus and is associated with hardwoods, and B is smaller, has a smooth pileus, a smaller spore Q value, and lives on conifers or hardwoods. Historically the name *P. caesia* has been applied to

material with relatively broad spores on conifers, whereas *P. subcaesia* and *P. alni* are characterised as having narrower spores, a preference for hardwoods, and a subtly different blueing reaction. Thus Group A had a relationship to *P. subcaesia* and Group B to *P. caesia*. However, the specimen/sequence correspondence was not so clear-cut. After including Norwegian material in their analysis (labelled N) Yao et al finally came to the conclusion there is considerable morphological variation in the complex across the European range which does not align simply with groups identified by their molecular study, or align with accepted morphological species concepts. They therefore questioned the use of the name *P. subcaesia*. With the subsequent addition of some more European material together with sequences from Japan, Canada and New Zealand the picture has become even murkier. Yao's group A still hangs together but Swedish, Japanese and New Zealand material now sit between B & A, and group B is all over the place. The inclusion of these additional sequences into the analysis supports the view this group is currently best treated as a single broadly defined and globally distributed taxon labelled *P. caesia*, corresponding to Group 2 in the tree. Apart from the New Zealand records *Postia caesia* is also reported on *Nothofagus* and other hosts in S. America (Rajchenberg, 2006). The morphology of the S. American material agrees with the New Zealand material.

The limited analysis (ITS1-5.8S-ITS2/Bayes) on the next page resolves three groups, but without support. Group 2 contains solely the *Postia caesia* complex, and as suggested by Tura may be worthy of recognition at generic level under the name *Cyanosporus*. Group 3 is the true home of *Postia* as it contains a sequence of the type species of the genus *Postia lactea* (based on the usual and sometimes incorrect assumption that material has been identified correctly). It also contains the type species of *Oligoporus*, *O. rennyi*. Group 3 clearly requires more sampling to resolve the relationships between the *Postia* and non-*Postia* species it includes. The three groups have some limited correspondence to the natural groups proposed by Pieri (1998). His 'Groupe Oligosporus' contains our Group 1 species: *P. balsamea*, and Group 3 species: *P. folliculocystidiata*, *P. ptychogaster*, *P. sericeomollis*, *P. rennyi*. His 'Groupe Cyanosporus' contains only our Group 2 species. His 'Group Postia' contains our Group 1 species: *P. fragilis*, *P. lateritia*, *P. hibernica*, *P. undosa*, and Group 3 species: *P. leucomallea*, *P. lactea*, *P. lowei*. Within this group of fungi anamorph forms are reported, e.g. *Ptychogaster* (Stalpers, 200) although I can see no sensible correlations with species in the tree (perhaps a warning that a number of Genbank entries are associated with poor identifications).


Laetiporus sulphureus-AY089742
Postia pelliculosa-HM583842
Postia lateritia-JF950567
Postia fragilis-JF950574
Postia hibernica-AJ006665
Oligoporus undosus-DQ384594
Oligoporus balsameus-AJ006666
Oligoporus balsameus-AY599566
Postia caesia-AY599572-UK-Pinus
Postia subcaesia-AY599577-UK-Acer
Postia-1-DQ195062-Switzerland
Postia caesia-AY599579-UK-Picea
Postia subcaesia-AY599578-UK-Fraxinus
Postia caesia-HQ604800-Canada
Postia subcaesia-AY599575-UK-Fraxinus
Postia subcaesia-AY599576-UK-Acer
Postia-AB509668-Japan
Postia subcaesia-PDD955774-NZ
Postia caesia-AF347111-Sweden
Postia caesia- AY599567-UK-Alnus
Postia subcaesia-AY599569-UK-Ulmus
Postia cf. subcaesia-AY599574-UK-Salix
Postia cf. subcaesia-AY599573-UK-Fraxinus
Postia caesia-AY599568-UK-Alnus
Postia subcaesia-AY599570-UK-Fagus
Postia cf. subcaesia-AY599571-UK-Alnus
Postia-DQ195063-Switzerland
Postia folliculocystidiata-JF950565
Postia ptychogaster-JF950576
Oligoporus lacteus-AJ006664
Postia tephroleuca-JQ700295
Postia leucomallela-AJ006663
Postia leucomallela-AY599565
Postia sericeomollis-AJ006667
Oligoporus rennyi-AY218416
Postia sericeomollis-AY672926
Albatrellus ovinus-FJ845400
Antrodia infirma-JQ700294
Antrodia leucaena-JQ700288
Fomitopsis cajanderi-DQ491407
Fomitopsis rosea-DQ491412
Postia lowei-JF950563
Antrodia juniperina-AY966454
Piptoporus betulinus-DQ491423
Piptoporus betulinus-EU294161
Antrodia bondartsevae-JQ700276
Fomitopsis palustris-DQ491404
Fomitopsis ostreiformis-FJ372684
Antrodia wangii-FJ617303
B+N
A
Group 1
Group 2
Group 3
0.2

The odd behaviour of Curtis Gates Lloyd

The name *Cyanosporus,* which is available for application to the *Postia caesia* group, was coined by Professor N.J. McGinty (Lloyd, 1909). McGinty was the pseudonym of Curtis Gates Lloyd (1859-1926) and I shall side-track a little to discuss him and his ideas. I already introduced Lloyd in Mycological Notes 9 where I noted is almost universal contempt for all living professional mycologists of his era, and a number of dead ones too. One of Lloyd's biggest gripes was with mycologists who 'name juggle' as he called it. He disliked the continual shift of species epithets from one genus to another. His view was that professional mycologists name juggled so they could append their name as the author of the new combination and thus gain vanity-fuelled recognition. Every now and then Lloyd seems to realise it was informative to 'correct' an earlier mistaken generic assignment and so rather than use his own name he used the name of McGinty to apply to recombinations.

Here's Lloyd describing his alter ego and supplying a photograph (Courtesy of Cybertruffle – thanks Dave, even though I didn't ask ;-)

"The followers of the late lamented Otto Kuntze will be pleased with the illustration that we are enabled to produce from our esteemed contemporary... ...illustrating an important event in the history of this school of nomenclature. Perhaps the most momentous incident in the literature of the school was the discovery that Professor McGinty made of the new genus 'Anthropomorphus' by which he was able to change all the names of the Geasters and added his name to them all. We had the great honor to have been entrusted by Professor McGinty with the original publication of his article, and in view of its classical value, we publish it again... ...The picture is a copy of an oil-painting that hangs in the rooms of the Poseyville Fungus Forage Club, and shows the Professor in the act of making his momentous discovery."

I know a number of biologists who would sympathise with Lloyd on the disruption caused by recombination but they are essential statements on improved knowledge of the correct classification of an organism. The problem is that our system of 'binomial' nomenclature (genus + species), which has been with us since Linnaeus, requires that a species names (but not higher taxa) have combined genus+species components, and if the opinion on correct generic classification changes then so does the name. In the future we will find better ways but we can't ignore 250 years of legacy data where one organism is known by multiple versions of the same original name.

Nearly a hundred years after Lloyd it is worth remembering that Zoologists under their different nomenclatural code, went down a slightly different route from botanists and mycologists. They do not attach authorship to recombinations and they do not have the same nomenclatural status as plant & fungi recombinations. The result is that they now have several million such name recombinations (taxonomic statements about correct classification) often with little idea of who said them (first), when they said them, where they said them, and thus why they said them. It is a considerably greater challenge in zoology than botany to unravel the taxonomic and nomenclatural past.

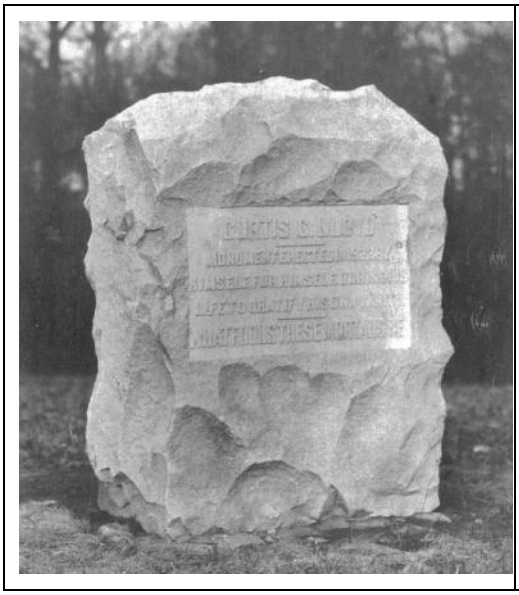
Back to C.G. Lloyd. He was a 'gentleman scientist', being financially supported by the successful family owned pharmaceutical company in Ohio. He was more interested in fungi than drugs. He travelled widely, including the pacific and took early photographs of many collections and built up a wide network of people who would send him material. He had a particularly strong fan-base of collectors in Australia and New Zealand and so his work is often relevant to us here in New Zealand.

Here's one of his self-produced Christmas cards with our hero flanked by his Pacific friends…

He also took some important and rare photographs of many of the mycologists he praised and then invariably criticised. It is sometimes entertaining to read his outbursts in the self-published 'Mycological Notes' (and my little series is named in honour of this mycological maverick). In later volumes of his works he would warn readers of abuse or sarcasm by annotating the script with an odd figure …

I have a copy of one of his volumes of Mycological Writings copiously annotated in the margin by our own G.H. Cunningham. You can sense Cunningham's rising blood pressure as you read his annotations on the scientific text, never mind the sarcastic bits.

Lloyd even managed to have a swipe on his way out …



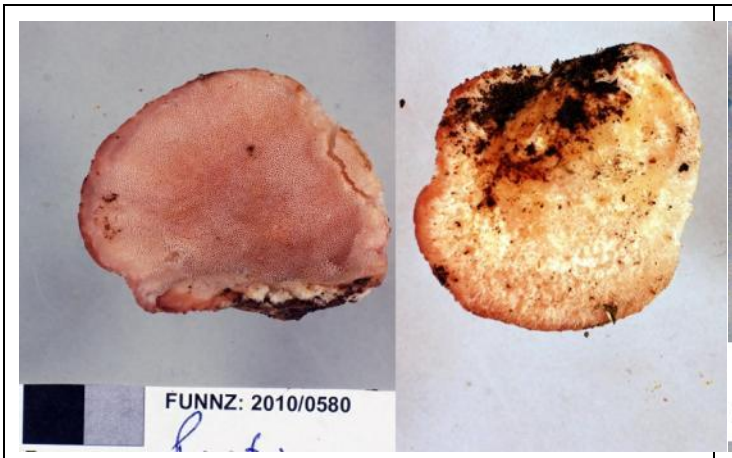
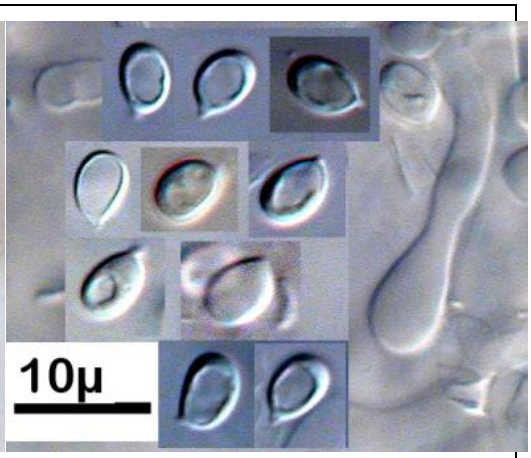
CURTIS G. LLOYD

MONUMENT ERECTED IN 1922 BY HIMSELF FOR HIMSELF DURING HIS LIFE TO GRATIFY HIS OWN VANITY

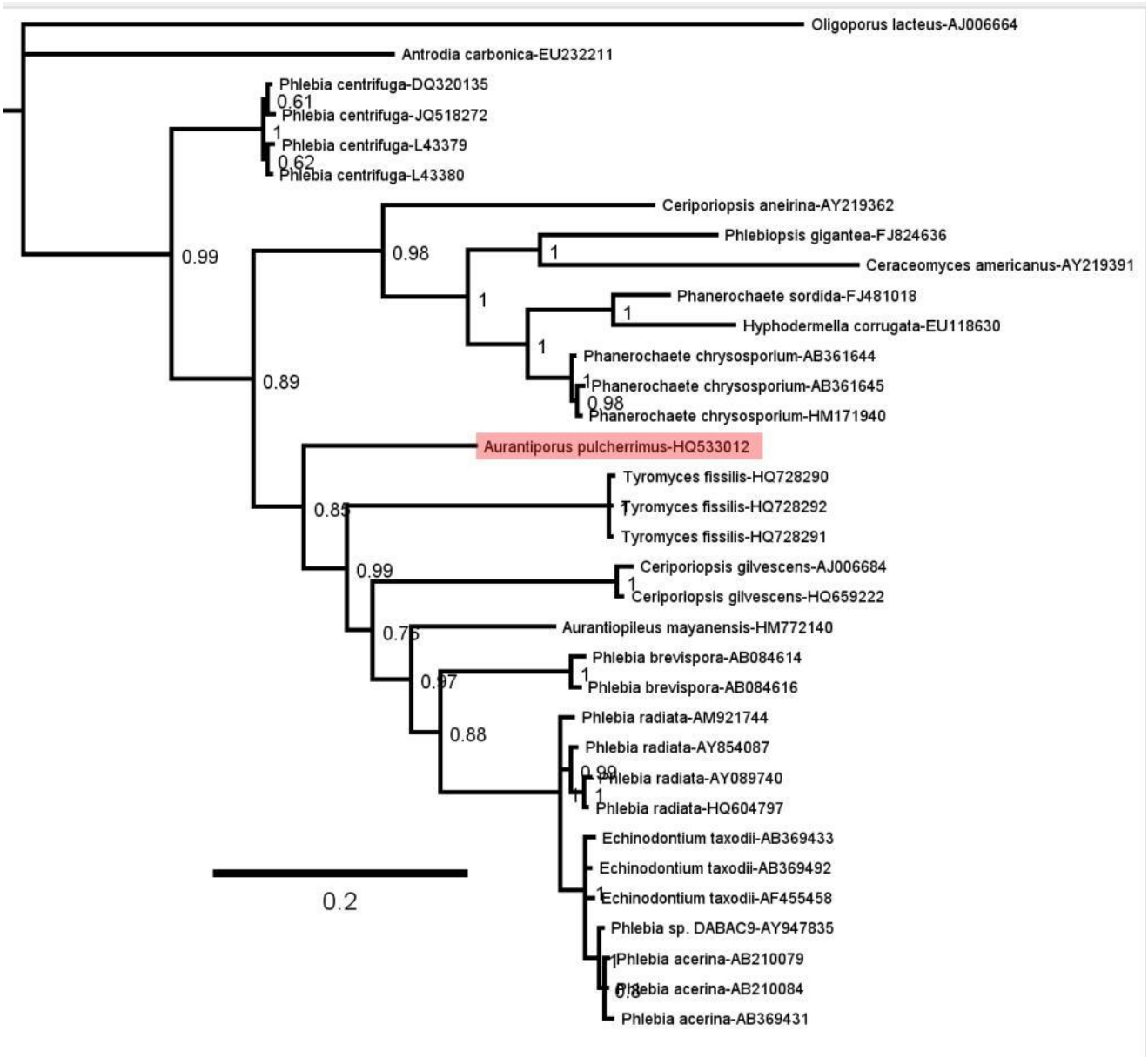
WHAT FOOLS THESE MORTALS BE!

Aurantioporus pulcherrimus - A Pink One

Aurantiporus pulcherrimus is generally much brighter red in colour but our material was immature. Like the blue one it was also subjected to molecular scrutiny. *Aurantiporus pulcherrimus* is reported from Australia associated with *Eucalyptus* and *Nothofagus*, New Zealand with *Nothofagus* and Brazil with *Eucalyptus*. It is also known under the name *Tyromyces pulcherrimus*.

	
PDD 95816	spores

The type of the genus is *Aurantiporus pilotae*. SpeciesFungorum currently accepts *A. albidus*, *A. alborubescens*, *A. fissilis (=Tyromyces fisellus)* in the genus. *A. albidus* is described from Argentina with *Nothofagus* and shows partial cultural compatibility with *A. pulcherrimus* (Rajchenberg, 1995) but is pale and effused. *Aurantiporus pulcherrimus* certainly fits Murrill's concept of this usually colourful genus. In 1975 Lowe made the comment "*Aurantiporus* differs only in the colour of the sporophore from typical specimens of *Tyromyces*" and thus he rejected the generic name. That view was also shared earlier by Cunningham who also considered *A. pulcherrimus* a *Tyromyces*. You can see from the ITS tree that our *Aurantioporus pulcherrimus* is a long way from the type species of *Tyromyces* (*Oligoporus/Tyromyces lacteus*). The neighbouring groups are quite sensitive to choice of included taxa and outgroup but the current evidence suggests *Aurantiporus* is a good and distinct genus as far as ITS sequences are concerned, although we won't know for sure until the type species of the genus is sequenced. Many authors (e.g. Rajchenberg, 2006 and references therein) consider the type species of the genus, *A. pilotae,* to be a synonym of *Polyporus croceus* (=*Hapalopilus croceus*) which has been sequenced and is shown to nest within *Hapalopilus* (Ko et al, 2001) thus potentially negating use of the generic name *Aurantiopilus* for *A. pulcherrimus*. The type of *A. pilotae* is from North Carolina, USA, whereas the type of *P. croceus* is from Europe. I note Murrill (1907) accepted the synonymy with a question mark. The equivalence of the American and European names was accepted by Lloyd, with his usual scathing remarks (Lloyd, 1913), and from there the synonmy seems to have passed into general acceptance – but is it correct? If it is then *Aurantioporus pulcherrimus* requires a new generic name. Its neighbour is listed as *Aurantiomyces* (*Tyromyces*) *fissilis* which is reassuring evidence for the independent existence of a genus, whatever its correct name. The data also show quite clearly that *Aurantioporus pulcherimus* belongs in the /phlebiod clade, i.e. assigned to the family Meruliaceae, as indeed should *Ceriporiopsis* (type *C.gilvescens*). At the moment the former is classified in the Polyporaceae (because of the position of *Hapalopilus crocees*) and the latter in the Phanerochaetaceae in the Dictionary of the Fungi.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Ceriporiopsis aneirina-AY219362
Phlebiopsis gigantea-FJ824636
Ceraceomyces americanus-AY219391
Phanerochaete sordida-FJ481018
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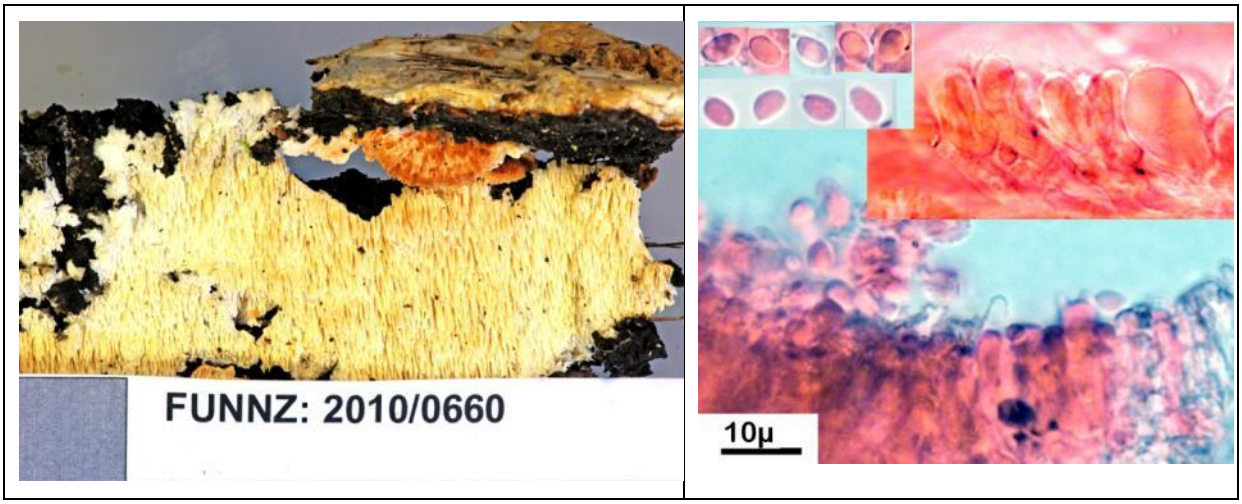
Phanerochaete chrysosporium-HM171940
Aurantiporus pulcherrimus-HQ533012
Tyromyces fissilis-HQ728290
Tyromyces fissilis-HQ728292
Tyromyces fissilis-HQ728291
Ceriporiopsis gilvescens-AJ006684
Ceriporiopsis gilvescens-HQ659222
Aurantiopileus mayanensis-HM772140
Phlebia brevispora-AB084614
Phlebia brevispora-AB084616
Phlebia radiata-AM921744
Phlebia radiata-AY854087
Phlebia radiata-AY089740
Phlebia radiata-HQ604797
Echinodontium taxodii-AB369433
Echinodontium taxodii-AB369492
Echinodontium taxodii-AF455458
Phlebia sp. DABAC9-AY947835
Phlebia acerina-AB210079
Phlebia acerina-AB210084
Phlebia acerina-AB369431
0.99
0.98
0.89
0.85
0.99
0.97
0.88
0.2

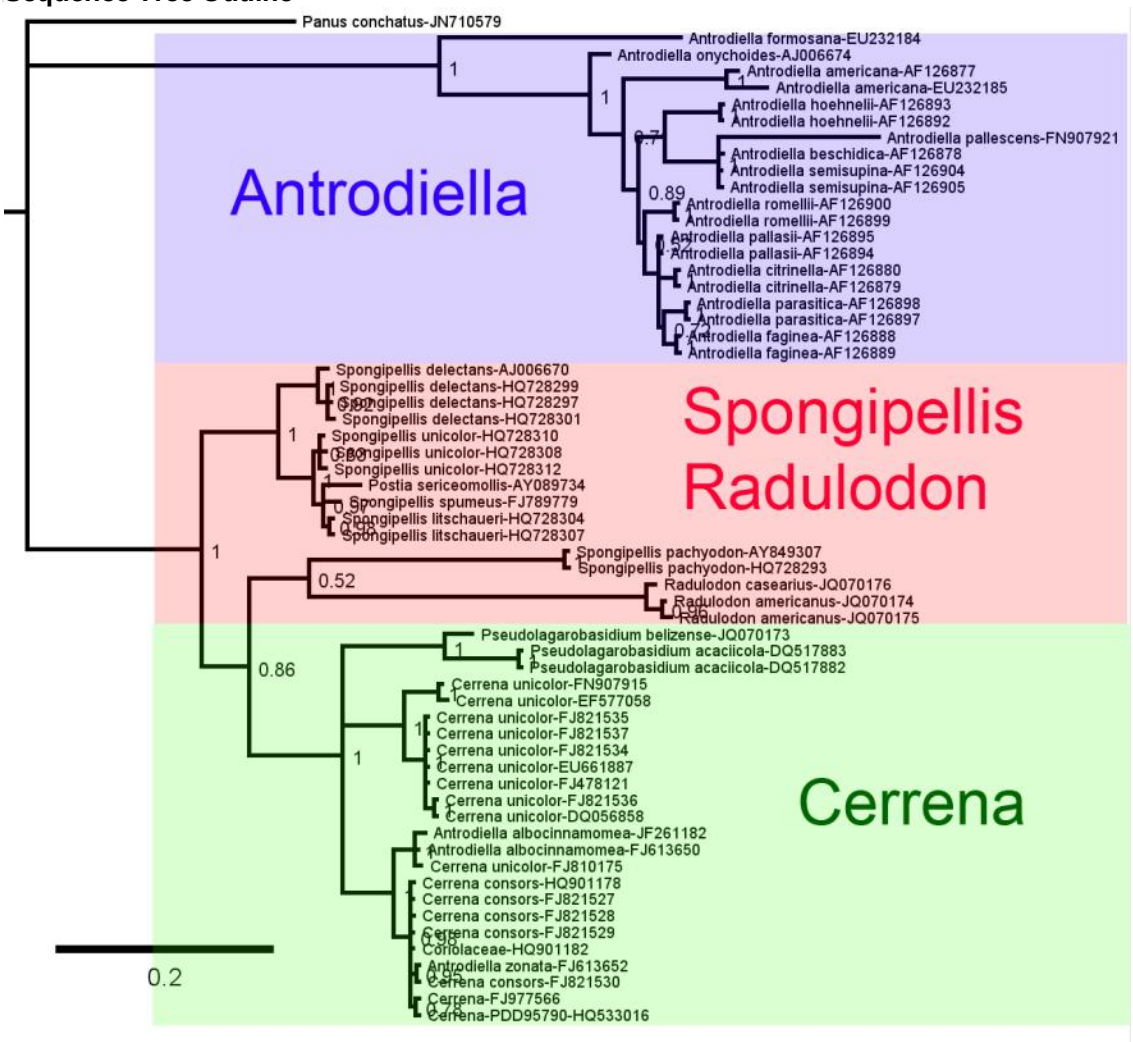
Antrodiella zonata – Neither Blue nor Pink

Antrodiella zonata is acknowledged as a species with varying morphology. The following discussion is on the basis that I got the identification correct, which is possible but not certain.

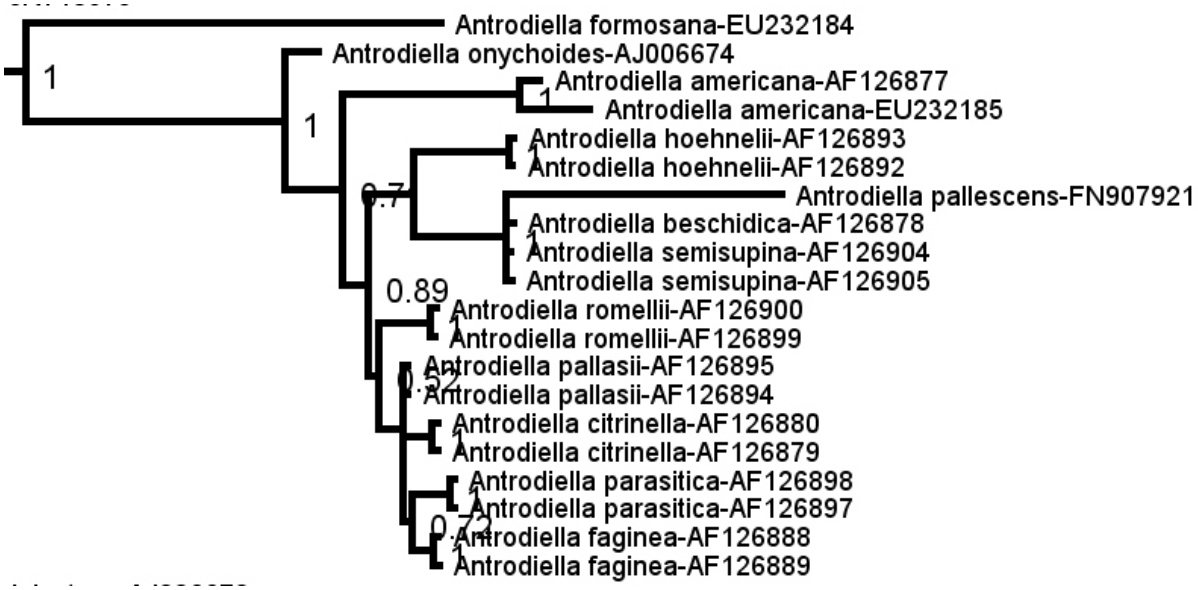


PDD 95790.

Sequence Tree Outline

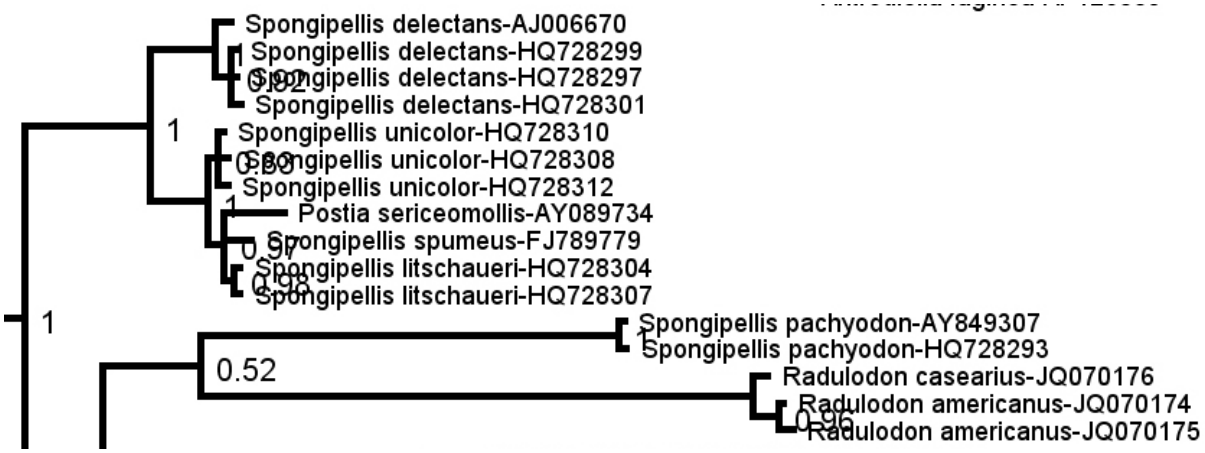


Antrodiella



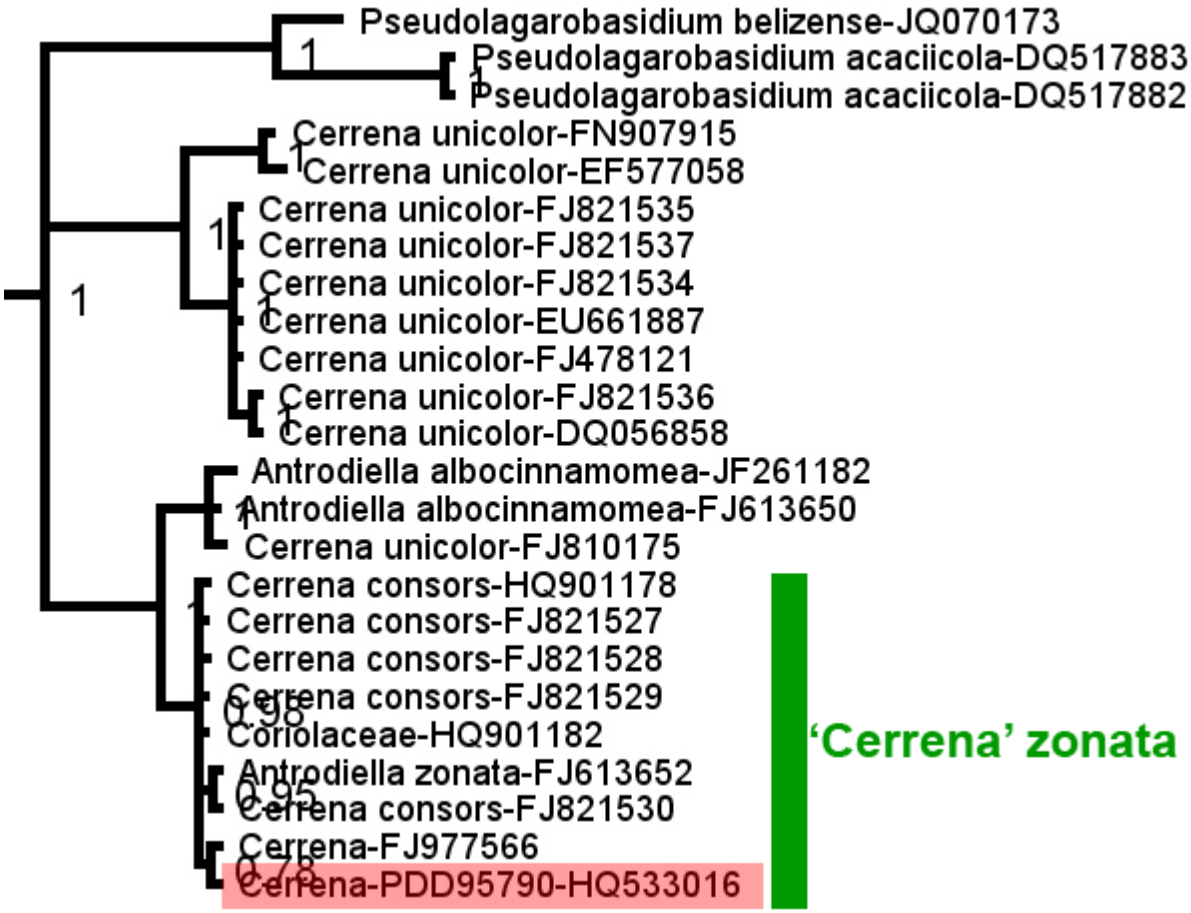
The type species of *Antrodiella* is *A. semisupina* and sequences labelled this are here.

Spongipellis & Radulodon



The type of *Spongipellis* is *S. spumeus* and a sequence labelled this is here, as is the the type of *Radulodon*, *R. americanus. Spongipellis pachyodon* is known under several names and currently accepted by SpeciesFungoum in *Sarcodontia*. Spirin (2001) proposed that *Sarcodontia* is a synonym of *Spongipellis.*

Cerrena



The type of *Cerrena* is *C. cinerea (=C. unicolor*) and sequences labelled this are here. So is our sequence of *Antrodiella zonata* (as PDD95790) although in a different clade linked on a branch with poor support. Interestingly this species bucks the trend because it does seem that the same taxon is globally disributed, at least from ITS sequence data. So the species is broadly distributed but the names applied to it have been equally broad. Certainly the genus *Antrodiella* lies convincingly elsewhere on the tree and is not the correct genus in which to place this taxon. *Antrodiella zonata* is associated with a known complex of names. Dai (2004) includes *Irpex cingulatus* Lloyd 1918, *Irpex consors* Berk. 1877 (=*Cerrena consors*), *Irpex decurrens* Cooke 1891, *Daedalea gollonii* Massee 1908, and *Irpex zonatus* Berk. 1854 (=*Antrodiella zonata*). The position of *Cerrena consors,* previosuly treated in *Trametes,* was established by Ko & Jung (1999) who did not consider this broader synonymy at that time. Again there have been different authors splitting and lumping over the years. It seems appropriate to follow both Cunningham (1965) and Ryvarden (1995) and consider all these names as corresponding to the same taxon. Currently the sequence evidence suggests the correct genus is *Cerrena* and thus the correct name for the taxon is *Cerrena zonata*, a new combination which is yet to be made, although that decision rests on better resolution of the relation between the two principle clades in the *Cerrena* tree together with the placement of *Psedolagarobasidium* (and the assumption that he the original identification was correct). Nakasone & Linder (2012) present essentially the same outline.

A number of related sequences in Genbank were were removed from the analysis as they were probable misidentifications. These include *Oxyporus cuneatus* (AB509794) which aligns with *'Cerrena' zonata*. *Rigidoporus vinctus* (HQ400710) which aligns with *Cerrena* but not other sequences deposited as *R. vinctus*. *Postia sericeomollis* (AY089734) aligning with *Spongipellis*.

Psedolagarobasidium (Hallenberg et al, 2008) belongs with *Cerrena* in the polyporaceae and not the phanerochaetacaeae as currently indicated in the Dictionary of the Fungi. *Antrodiella albocinnamomea*, if correctly identified, requires moving to *Cerrena*, as noted by Nakasone & Linder (2012) and the sequence FJ810175 named *Cerrena unicolor* is the same taxon.

References

Dai, Y-C.; Notes on the genus Antrodiella (Basidiomycota, Aphyllophorales) in China, Mycotaxon, V89, pp.389, 2004

Hallenberg, N.; Ryberg, M.; Nilsson, R.H.; Wood, A.R.; Wu, S-H.; Pseudolagarobasidium: on the reinstatement of a genus of parasitic, saprophytic and endophytic resupinate fungi. Botany, v86, pp1319-1325, 2008

Ko, K.S.; Jung, H.S.; Molecular phylogeny of Trametes and related genera. Antonie van Leeuwenhoek 75:191–199. 1999

Ko, S.K.; Jung, S.H.; Phylogenetic re-evaluation of Trametes consors based on mitochondrial small subunit ribosomal DNA sequences. FEMS Microbiology Letters, v170, 2999, pp181-186.

Ko K.S, Jung H.S. & Ryvarden L. Phylogenetic relationships of Hapalopilus and related genera inferred from mitochondrial small subunit ribosomal DNA sequences. Mycologia v93, 2001, 270-276

Lloyd, C.G. A New genus Cyanosporus, Mycological Notes n33 in Mycological Writings, v3,1909, p436

Lloyd, C.G.; Synopsis of the genus Polyporus, Mycological Writings, v4, 1915, p333

Lowe, J.L.; Polyporaceaea of North America. the genus Tyromyces.; Mycotaxon v2, pp1-82, 1975

Murrill, W.A. North American Flora, v9, 1907.

Nakasone, K.N.; Linder, D.L.; taxonomy of Pseudolagarobasidium. Fungal Diversity, v55, 2012, pp155-169.

Pieri, M.; Rivoire, B.; Postia inocybe f. inocybe et f. pileatus f. nov. Notes nomenclaturales sur le genre Postia; Bull. Myc. Soc. Fr. v114, 1998, pp19-33

Rajchenberg, Los Poliporos de los Bosques Andino Patagónicos de Argentina, Bibliotheca Mycologica v201, 2006

Rajchenberg, M.; Notes on New Zealand polypores 2. Cultural and morphological studies of selected species, New Zealand Journal of Botany, v33, pp99-109, 1995.

Rajchenberg, M.; New Polypores from the Nothofagus foests of Argentina. Mycotaxon 54: 427-453, 1995

Spiring, W.A.; Tyromyces.; Mycena, v1, 2001, pp64-71.

Tura, D.; Wjacheslav, A.S.; Zmitrovich, I.V.; Wasser, S.P.; Nevo, E.; Polypores new to Israel, Mycotaxon, v103, pp217-227, 2008

Yao, Y-J; Pegler, D.N.; Chase, M.W.; Molecular variation in the Postia caesia complex, FEMS Microbiology Letters, v242, p109-116, 2005

Stalpers, J.; The genus Ptychogaster. Karstenii, v40. 2000, pp167-180.