DNA Sequencing Results

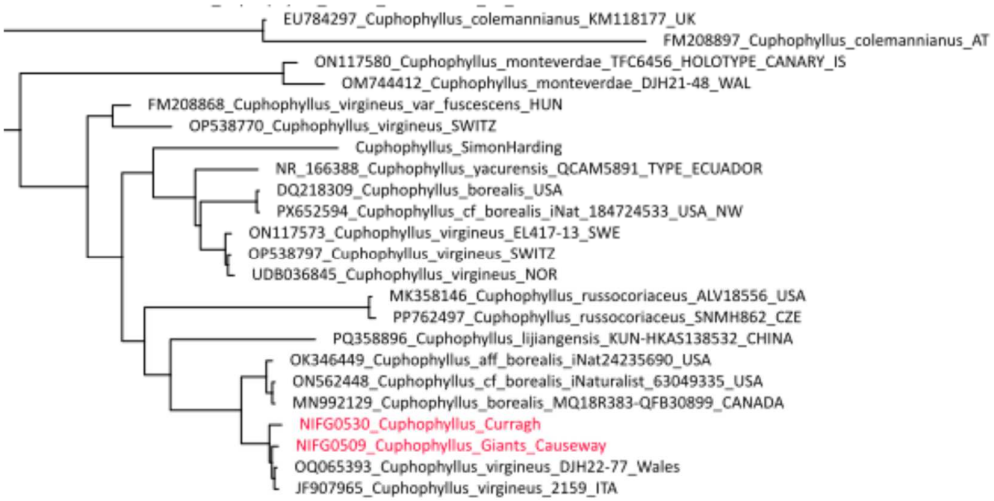
Update December 2025 Part 2

Waxcaps

- ***Cuphophyllus lacmus.*** The Grey Waxcap. This was found at Smelt Mill Bay in exactly the same place as I found it 28 years ago when an over friendly Red Setter obliterated it leaping all over me just as I had photographed it. Found in amongst heather, this species has been found to inhabit the heather root tips on Lundy and here it was, in the same situation. Maybe forming a mycorrhizal sort of relationship? There are some taxonomic questions about this species as a Canadian paper split *Cuphophyllus subviolaceus* from *C. lacmus* so it will be really interesting to see if this is accepted in David Boertmann's new book when it comes out next year. If they are separate, this is *C. subviolaceus* as it is in that clade. Interestingly, *C. lacmus* is supposed to have a rancid taste and this had no taste at all which maybe further points to *C. subviolaceus.*

- ***Cuphophyllus pratensis var. pallidus***. Found by Hazel Watson at Kinramer North on Rathlin. The white *Cuphophyllus* species (all *Cuphophyllus* have interwoven gill trama) have to be carefully looked at as there are possibly cryptic species in there. I have seen photos of *Cuphophyllus angustifolius* that look identical to *var. pallidus* and *C. monteverdae* is also similar but blackens on drying. Hence, I was taking a number of specimens to check them. I have failed on a few and will repeat but this one was clearly *C. pratensis var. pallidus* itself.

- ***Cuphophyllus cf virgineus***: We had a lot of discussion about whether caps were dry because they are naturally dry or dry because they have been dried out by the wind and they are actually greasy. I've only just got my microscope back after being fixed so I had just collected these and sequenced them. It is a bit of a surprise that the following two are different to the above *pallidus*. Their sequences appear near to the Snowy Waxcap, *Cuphophyllus virgineus* but the match is not close and I am going to have to look at the cap cuticles of these. They are also close to sequences labelled as *C. aff. borealis* and *C. aff. virgineus*. It is the first time I have looked at a phylogenetic tree in this area and it looks like there maybe more than one species in the *virgineus* group. I will now sequence a "standard" looking virgineus to see where that is placed. I dread this group being split…..

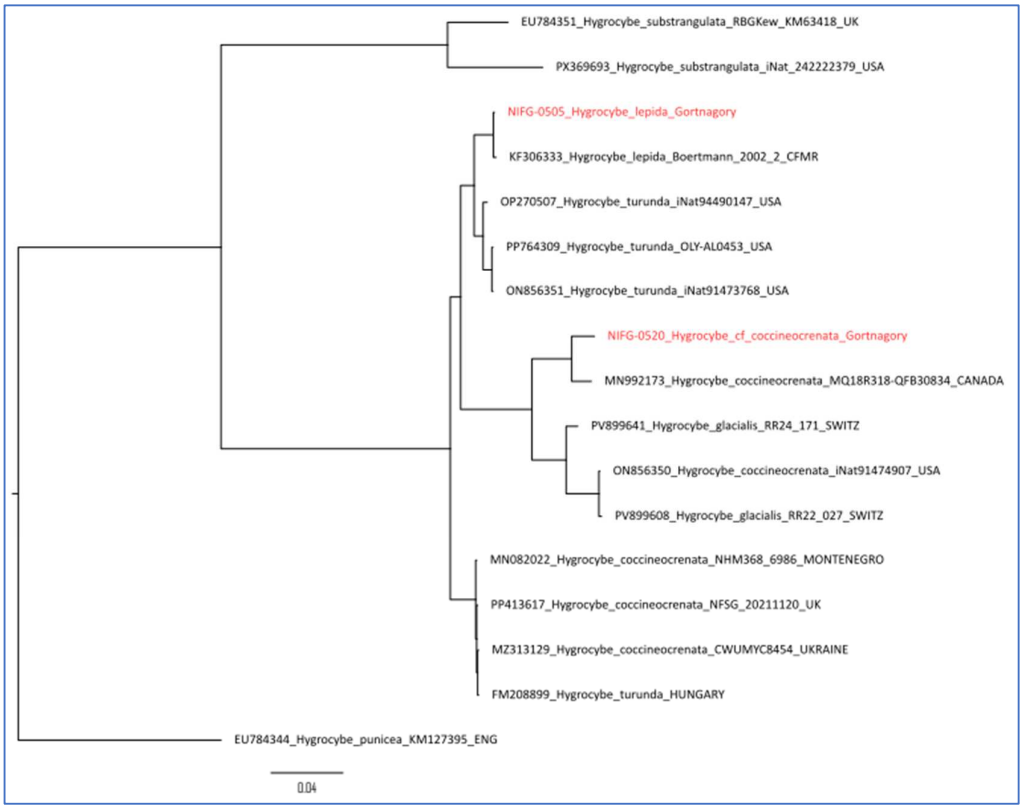


C.virgineus at the Giant's Causeway looking very like the Rathlin *pallidus*. Found by Amy Baird

C. virgineus from the Curragh. This one I find easier to believe. Found by Maria Long.

- ***Hygrocybe lepida:*** Previously known as *H. cantharellus* until it was realised that the American species is different to the European one with *H. cantharellus* now being the American species and *H. lepida* being the European one. However, it is thought that this group may still be a species complex. During the Gortnagory downpour, Matthew Flood found this *lepida* which looked odd with the two tone stipe but it is a good match (99.69%) to specimens of *H. lepida* collected by David Boertmann.

- ***Hygrocybe coccineocrenata:*** I thought that this one might also be *lepida* but it had faint black squamules on the cap with the rest of the cap being very scarlet. The spores were also markedly large up to 13µm long which is too long for *lepida.* Unfortunately, I have no photograph of it as the rain was particularly bad when it was found but I should have photographed it later for the record and am kicking myself about that one. The sequence does not have a great match to anything but does cluster in a tree with the only curated sequence of *coccineocrenata* on Unite. There are a few other *coccineocrenata* sequences on GenBank but they look different. There are extremely few European sequences of this whole group and what is desperately needed is reference sequences for all the European species and hopefully this will come out of Boertmann's next edition. As Boertmann writes in his book, *lepida, turunda* and *coccineocrenata* are all very close and a bit confused in the literature and that is reflected in the phylogenetic tree below with mixed labelled sequences in the same clade. The habitat would say *turunda* for this one as *coccineocrenata* is more typical on bogs in sphagnum and this find was not in a particularly wet spot and certainly not in Sphagnum. Sometimes the two are split on cap colour with *turunda* being more orange and *coccineocrenata* being red but not in all descriptions! I think this one is *coccineocrenata* for now from the phylogenetic tree below but it will be re-examined when the new book comes out.



- ***Waxcap unknown:*** This one came from Ballycoos, the hill on the Scawt Hill side of Linford Barrows. It comes out not near to anything at all and the sequence is good and clean. I thought it could be *Gliophorus europerplexus* but now wonder if the two specimens in the photo may actually be different. I will re-do and sequence the smaller specimen.

Fairy Clubs

- ***Clavaria falcata***: Two finds of this. One expected, one totally not expected. *C. falcata* is the new name for *C. acuta* and is usually recognised by being single non-branched white clubs with large subglobose to ellipsoid spores. Soil eDNA has been finding a number of very similar looking things in this area and these do need checked, especially looking for warty spores. The first find below was by Killian Brennan at the Curragh and is the typical form of *C. falcata.* The second one I find bizarre as it is yellow and I was expecting *Clavulinopsis.* Another one for the microscope now it is back as I am wondering if there was cross contamination as I find it hard to believe. From Rue Point on Rathlin.

Clavaria falcata, The Curragh

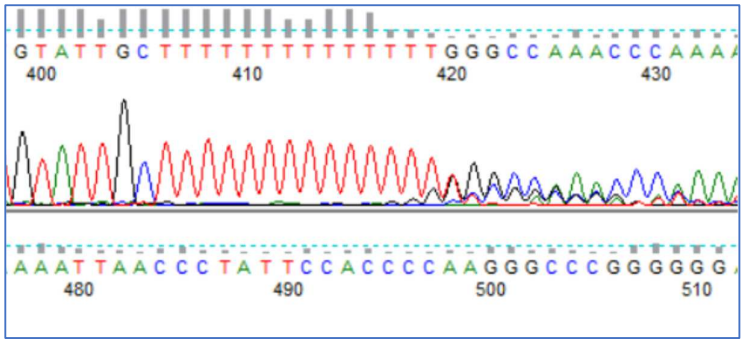
Clavaria falcata??? Rue Point, Rathlin

- ***Clavaria cf fragilis:*** Yet another puzzle. From Ballycoos by Linford Barrows and found by Matthew Flood. The sequence is closest to *Clavaria fragilis* but it appears close but different. See the *Clavaria* phylogenetic tree below. The sequence is of good length and clean but I will try to get another sequence from the other direction to confirm and to get a longer sequence. It also does not appear clumped as *fragilis* normally is….

Clavaria cf fragilis, Ballycoos

- ***Clavaria messapica:*** A lot of the pink fairy clubs are turning out to be *C. messapica* rather than *C. incarnata* as originally thought. They do cluster differently and ours are clearly *messapica.* Two finds – one from Binevenagh found by Kathryn Keys and the other from Runkerry found by Simeon Cathcart.

- ***Clavulinopsis sp 1:*** I thought originally that I may have had *Clavulinopsis trigonospora* finding single yellow clubs with odd shaped almost triangular spores. Then I found other ones with large globose smooth spores that ruled out *C. luteoalba, C. laeticolor* and *C. helvola.* There may be two different things here or they may be the same but what they are, I have no idea. I wondered about the New Zealand species *C. simplex* but the spores seem a bit larger so I was really hoping sequences would help here. However, the sequences all came back nice and clean and then suddenly went wrong – and all at the same place. Looking at the sequences, it is where you get a long chain of the same base pair and it is known that Sanger Sequencing can "slip" at this point. So, I am going to have to get a sequence from the other direction and patch the two together. Then hopefully more light might be shed on this one(s) but it is / they are definitely odd. I have 4-5 samples of these one or two species. I have plotted the sequences in the tree below from what I have and they are appearing different to *simplex* and to other sequences.



- ***Clavulinopsis sp 2:*** Another real surprise. This is a really odd white broad compressed fairy club from the Curragh found by Killian Brennan. *Clavaria tenuipes* was one suspect but the sequence places it in *Clavulinopsis* but the slipping problem has happened here as well so I need another sequence from the other direction. I do not know of any such species in *Clavulinopsis* so do need to check against cross contamination. Finding clamps will put confirm it in *Clavulinopsis* so there is work to be done on this one.

- ***Clavulinopsis luteoalba:*** A relief. A nice clear sequence clustering in a known clade. The Apricot Club from the Giant's Causeway but not a typical growth form being quite large and broad. Found by Jolanda Smit.

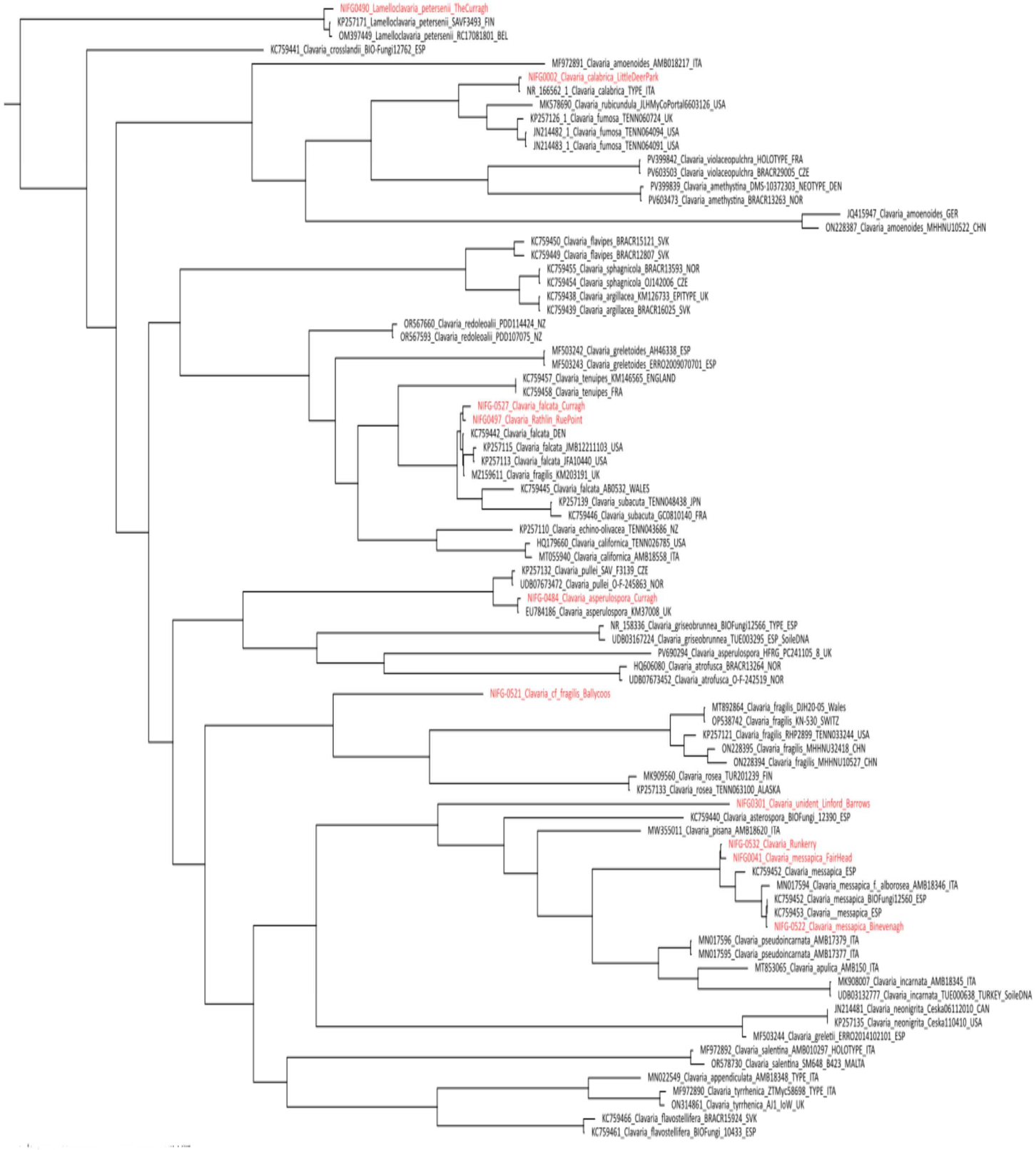
- ***Hodophilus anatinus:*** This is without doubt turning out to be the most common *Hodophilus* on this survey. In the yellow stiped group, unlike the find from the Curragh in the last report, these yellow stipes are much more vague showing how careful you have to be.

Hodophilus anatinus from the Curragh found by Jolanda Smit

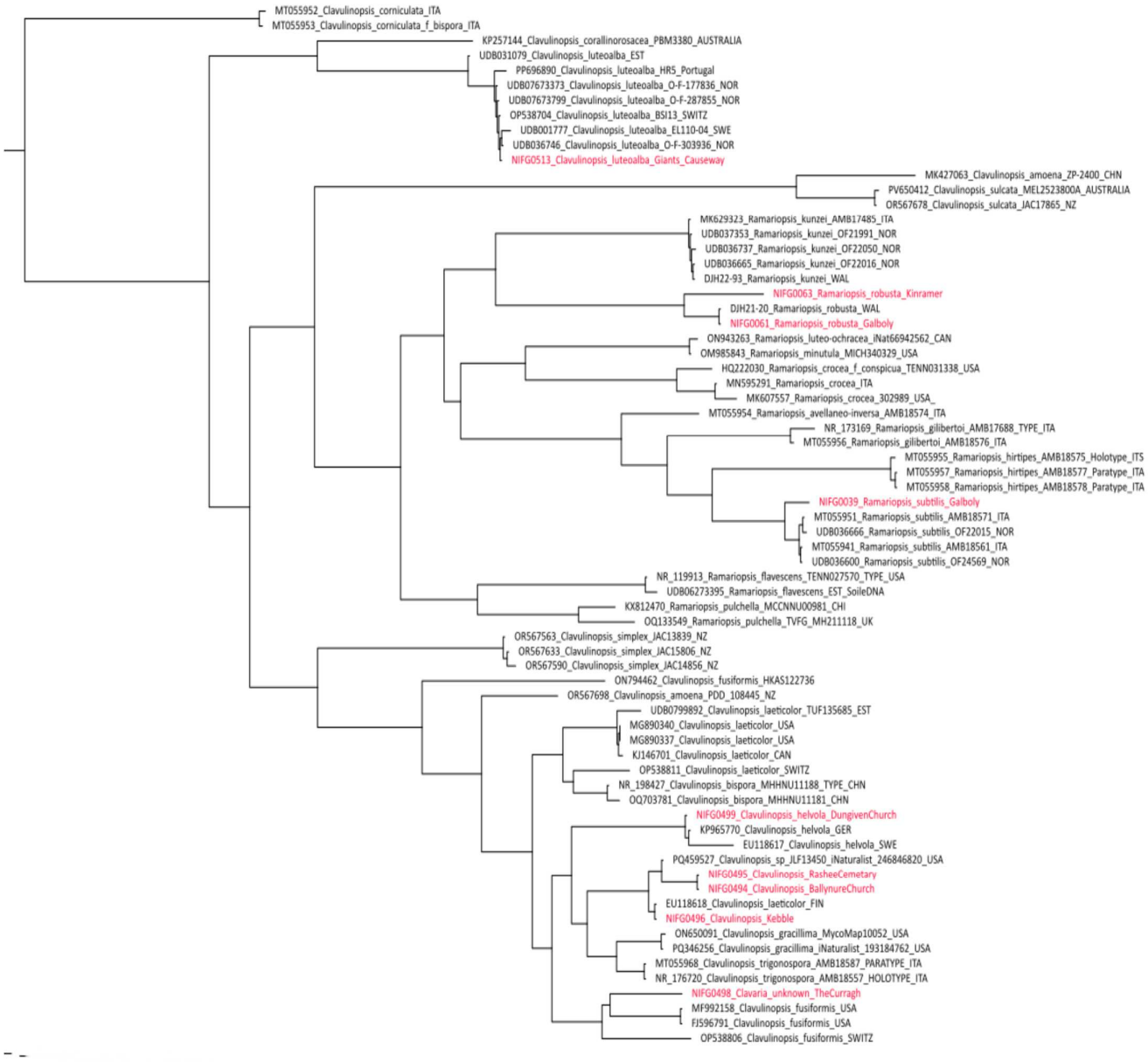
Hodophilus anatinus from Ballycoos found by Jolanda Smit

- ***Lamelloclavaria petersenii:*** A first record for Ireland and maybe only the second or third record for the British Isles as a whole. From the Curragh, I thought this might be *Camarophyllopsis schulzeri* but I fail again to find that. This was the first gilled fairy club until *Camarophyllopsis* and *Hodophilus* were also transferred into the *Clavariaceae.* Distinguished from *Camarophyllopsis* and *Hodophilus* by the cells in the cap which in this species are filamentous and branching. It seems to be very rare across Europe.

NIFG Clavaria Phylogenetic tree December2025



NIFG Clavulinopsis Phylogenetic tree December2025



Earth Tongues

- ***Geoglossum fallax:*** This is the most common earth tongue and is noted by producing a huge quantity of clear, non-septate spores when young, having mature dark spores with 7-14 septae and with paraphyses that have their tips often coated in gunk. I have been finding some specimens with paraphyses that have encrustations and also some with no gunk. The other possibility in this area is *Geoglossum starbaeckii* so I sequenced some specimens from Divis, Gortnagory and Linford Barrows. However, sequencing does not really help. There are no sequences of *G. starbaeckii* on GenBank or Unite. This area needs detailed research but it looks like ones with encrusted hyphae may be different as there seem to be a few clades of specimens labelled as *G. fallax.* One weakness of GenBank and Unite is there are few links from the sequence to details of the actual record so I have no idea if the other sequences near to mine have the same characters. It is a case of upload the sequences to GenBank and wait for research in the area to be published.

- ***Microglossum nudipes aff.*** Like *Geoglossum, Microglossum* is a genus that also needs more research. I do find that the published keys do not always work as specimens with short spores often have sequences of species with supposedly long spores. There are temporarily named clades like "*nudipes aff."* and "the brown clade" that need to be described and then the position of *M. olivaceum* itself needs to be established. *M. nudipes aff.* is a complicated concept as there appear to be two different clades of these specimens. One of these may become *M. olivaceum* itself but that has not yet happened. There are three more finds of *M nudipes aff.* – from the Curragh found by Jolanda Smit, from Linford Barrows found by Kathryn Keys and Cushleake found by Jolanda Smit.

M. nudipes aff. – The Curragh

M. nudipes aff. – Linford Barrows

M. nudipes aff. - Cushleake

- ***Microglossum pratense.*** Two new finds of this all green *Microglossum* – from the Curragh found by Tomas Milan and Christ Church at Ballynure.

M. pratense – The Curragh

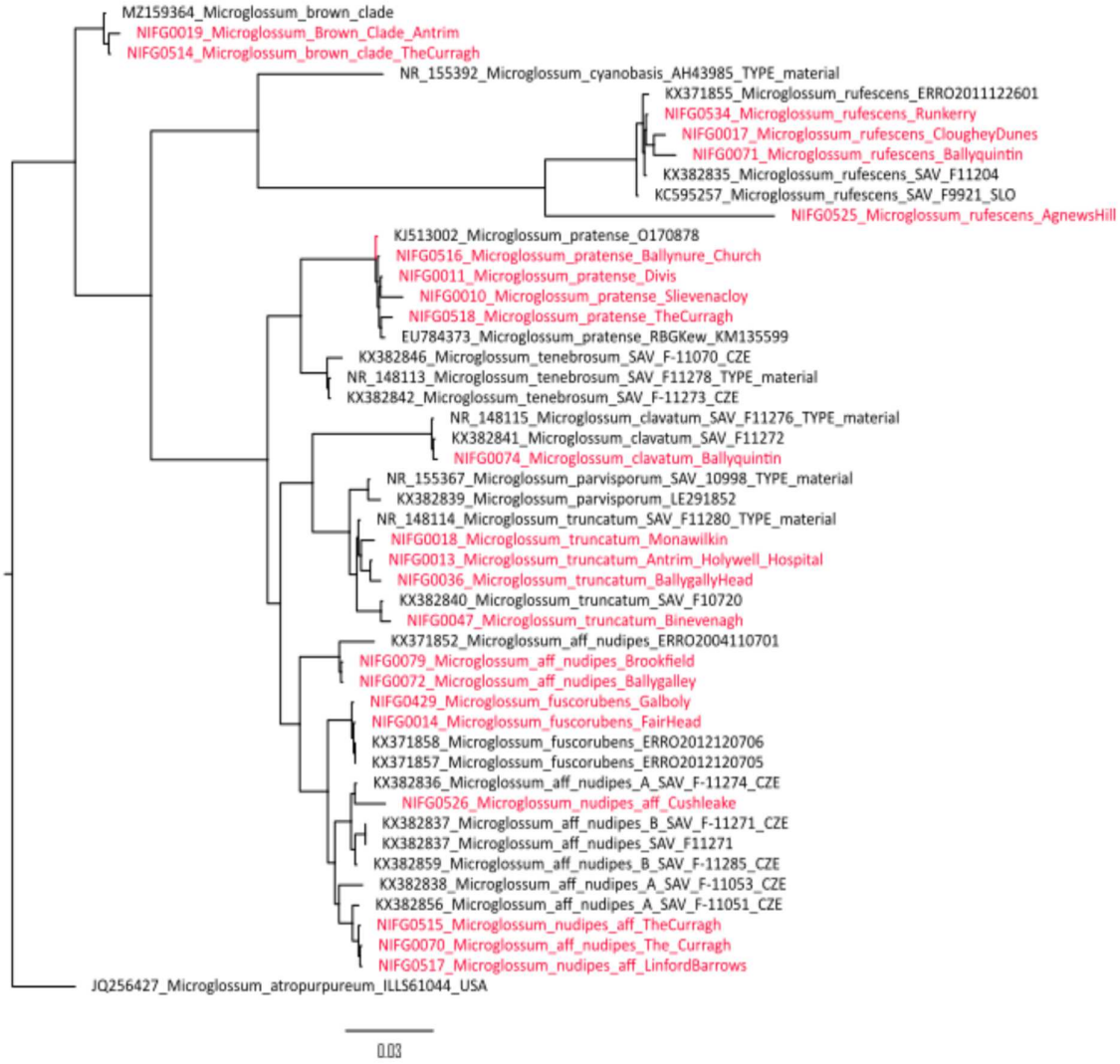
M. pratense – Christ Church, Ballynure

- ***Microglossum rufescens.*** Two more finds of this – from Runkerry by Simeon Cathcart and Agnew's Hill

M. rufescens at Runkerry

- ***Microglossum 'brown clade':*** One find of this from the Curragh found by Jolanda Smit

NIFG Microglossum Phylogenetic tree December2025



- ***Trichoglossum walteri aff.*** A Trichoglossum with spores with 7 septae instead of the 15 of *T. hirsutum,* this is not “walteri” as this was described under tree ferns in Australia and does not actually occur in Europe. Work is ongoing in this area and this sequence and description can hopefully help this process. Found in Cushleake by Jolanda Smit

Others

- ***Arrhenia cupulatoides:*** This is a tiny *Arrhenia* fruiting out of a *Peltigerina* lichen. This used to be known as *Arrhenia peltigerina* but sequencing revealed seven different clades. Two species which have been found in the British Isles - *Arrhenia cupulatoides* and *Arrhenia mohniensis.* The two are differentiated by subtle differences in spore sizes and sequencing really helps to differentiate them. One find by Jolanda Smit, from Dungiven Church of Ireland came out as *Arrhenia cupulatoides* which is a new Irish record. I have two more specimens to look at – from Linford Barrows and the other one an older find by Kathryn Keys from Galboly.

- ***Mycopan scabripes:*** Described in the last report as a new Irish record, this is a second find from Linford Barrows. The gills do look very *Mycena* like and the dark brown cap with a black centre does look quite distinctive.