

Take your auger out with you!

Caroline Hobart*

August 2015 was an exciting time. During a visit with my father to Wales and out on a remote mountain road, I stopped to look at the spruce plantations up near Rhyd. I collected and subsequently recorded the first UK collection of *Chamonixia caespitosa* (Hobart 2016). Nine years later the world has moved on. It is now a common research practice to put an auger in the soil, draw out the contents and take it to the lab for sequencing using HTS (High Throughput Sequencing): eDNA is here (environmental DNA) and it tells us all we need to know, or does it?

In January 2024 I was contacted by Dr Andy Taylor from the James Hutton Institute. Andy, a molecular ecologist and old friend, had been extracting soil samples for eDNA in spruce plantations at Creagan near Oban. He had, in amongst the huge numbers of sequences, a result that matched a sequence of *Chamonixia caespitosa*. Surprised that I had already found this rarely reported species in Wales, he asked if I had a photo for a press release. I was able to provide a rather poor, blurred image that I hadn't used in my FM article and I began thinking about eDNA as well as the *Chamonixia* find.

Firstly the *Chamonixia*

Following my 2016 article I had thought more about the rarity of the fungus. In 2018 after a further site visit and noticing that vast tracts of

the surrounding woodland were being felled, I contacted a number of people in Wales to see if this fungus could be red-listed. The responses were helpful, but not encouraging. It was apparently very difficult to prioritise fungi associated with native trees, but near impossible for fungi in non-native forests. *Chamonixia* could be fairly common in these Welsh woodlands, but there were relatively few people recording hypogeous fungi, so it might not be possible to determine its true rarity or distribution, therefore a case to preserve it might be difficult. It was suggested that I attempt to assess it for the IUCN global Red List.

Recently, in an email discussion with Andy, I suggested to him that it was probable that it also grew elsewhere; I was delighted to read in the newspaper that he had had more luck than me. With DNA tools that I had no access to, and probably more 'clout', he has been able to persuade Forestry and Land Scotland to support a project to properly study soil samples in other Scottish plantations. This should eventually give us a better idea of its rarity and distribution. All this was reported in the Guardian newspaper on the 12th of April, 2024.

So finally eDNA

It is becoming ever more common for soil samples to be taken in grasslands, forests and other land and water masses to monitor biodiversity.



Fig. 1. *Chamonixia caespitosa* showing the intense blue staining of the surface and at right the internal pale gleba. Found in a *Picea* plantation, near Rhyd, Wales, 2015. Both photos first published in FM17(2): 60 in 2016, © Caroline Hobart.

Technological advances have been made in the last 15 years and as a result sequencing costs have come down. The last eDNA costing I obtained in 2022 was about £300.00 per sample for looking at fungi. For those interested in an excellent overview of methodology, process, advantages and pitfalls of this technique see Deiner *et al* (2017). A further example of an eDNA study, this time in grassland, monitoring for fungal diversity and abundance in the White Peak, a limestone plateau in the Peak District, can be found in Griffith *et al* (2022). More recently, despite government funding squeezes, Natural England have been sampling oak woodlands using eDNA in the south west of England.

In summary eDNA using HTS will, in combination with traditional survey methods, no doubt become the next tool in the armoury of the amateur mycologist/citizen scientist. Take your auger out with you!

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References

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Fig. 2. *C. caespitosa* found in the Jura, France, Sept. 2012. Photograph by Gerhard Koller, ex Wikimedia Commons.