North Eastern Fungus Study Group

Newsletter No 102 - Autumn 2021

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NEXT ISSUE: The deadline for articles for the Winter newsletter is 20th February 2022
All contributions will be gratefully received!

Forthcoming Events

12th February 2022 – AGM at Rainton Meadows (to be confirmed)

Update From The Chair That Speaks

Yes I am still here—and foraying far and wide.

Our 2021 foray programme was completed successfully last weekend. As always conditions varied as did finds numbers, but most importantly we enjoyed ourselves.

I am told that we have recruited many new members—which is good news for all sorts of reasons such as “the more eyes on a foray the more we are likely to find”. But that only applies if you come along to forays. Certainly we have met with some new members at forays this year, but many more are known only by name and email address. We hope to meet you in 2022..

Mike Cruse, our indomitable Director of Communications [his target is a minimum of 5 emails a day!] has emailed all of you seeking ideas for foray locations in 2022. Please don't be bashful. New sites—from localities near you—are always welcome.

This winter it would be good to get back to a normal, face to face, AGM at Rainton Meadows near Durham. I have therefore booked Saturday 12th February 2022 at 11a.m.. We will see how Covid

develops this winter. Your committee will discuss the practicalities when it meets in January and will let you all know by the end of January if the AGM will go ahead.

We have heard from our German mycological friends and they have invited us to visit them in 2023—the dates are October 12th--17th 2023. More details will follow.

Committee members have also been talking about an away weekend somewhere in 2022 [partly as possible preparation for a return visit by our German colleagues in 2025/26!--nothing like a bit of forward planning.] I quite like the idea of a visit to the ancient Caledonian pinewoods of Scotland with their fungal specialities. So, CAMERON, if you are reading this, when we were at Lindisfarne a couple of years ago you mentioned a venue [near Forres I think] that Scottish fungus groups use—if you remember can you send me information on it—my email is alansimkins687@btinternet.com

Alan Simkins

The Fly Fungus from Errington Wood Nov. meet.

Amongst the leaf litter soil at Errington Wood foray I found a micro fungus or germinating seed, (???), and popped it in my box. Only examining it later did I realise that it was actually a cordyceps fungus, with a fine curly pale stem and tiny conical head, growing out of a Bluebottle fly. After an evening of trawling the net and going in circles, (name changes/synonyms/foreign species…), I could only get to *Ophiocordyceps* so I sent out a cry for help! Keith Tulip sent me information and a likely ID of *O. forquignonii* as its host are flies and his articles noted that Babs Walton + Alan Legg found it at Ministeracres Monastery in 2002, but minus the fly, and Dominique found the likely anamorph earlier at Bolam Lake. Cameron Diekonigan, BFG, who is familiar with the species, also gave this ID and has since examined the specimen and confirmed it as ***Ophiocordyceps forquignonii***. There are 50 UK records on NBN Atlas plus Mike has checked CATE2 - 7 records, the 2 nearest being VC64 in 1999 and 2005, recorded by Archie and Mal Greaves.
Many thanks for the team effort on this one!



Jill Cunningham

Jubilee Waxcap – Farndale

A rare find on the foray at Frost Hall Farndale – 24th October.

Paul Forster

An urban cemetery in late autumn

Three intrepid ladies [Jo S., Jill C., Daphne A.] and his nibs enjoyed a pop-up foray at North Ormesby Cemetery [aka St. Joseph's Cemetery] adjoining Trunk Road and Ormesby Road in East Middlesbrough on 4th November.

I had been alerted to the opportunity by email from Martin Allen, botanist extroardinaire, who is regularly commissioned by Tees Valley Wildlife Trust—and also Middlesbrough Council it appears, which is considering declaring a Local Wildlife Site at the cemetery and had asked Martin to do a plant survey.

There must be something about old cemeteries and fungi. As we in NEFSG know, our founder Alan Legg spent decades surveying fungi at Darlington West Cemetery. Is it just about undisturbed, unfertilised grassland—or is there something more macabre at work encouraging fungal growth? We may never know.

First off we were finding scores of clumps of Psathyrella multipedata—almost as if they had been "planted" at every grave [slight exaggeration here folks]. Many clumps were wilting on this my second visit but one fresh clump encouraged a photo from Jill*.

Psathyrella multipedata

Accompanying several of these clumps were troops of Lepista saeva, fresh ones still with their violet stems—tasty morsels indeed.

In the south east of the cemetery we were excited to find vast numbers of waxcaps, particularly small to medium sized yellow ones, many of which were quite washed out with whitish yellow caps but with darker, orange gills. Jill, with her amazingly sensitive nose, quickly declared a strong oily smell leading to an identification as Hygrocybe quieta.* Some of you may know of my legendary poor sense of smell so I happily countered with "no smell of oil, must be Hygrocybe chlorophana" Just the right ingredient for a good argument. We carried on for some time smelling and pontificating on the little blighters. To preserve sanity and equanimity I suggested that we conclude that there were probably some of both species present. Also seen were examples of H. ceracea, H. coccinea, H. conica, H. insipida, H. pratensis, H. psittacina*, and H. virginea—so quite a good haul of H.'s.

Hygrocybe quieta

Other quite abundant fungi included :
Lyophyllum decastes*
Calocybe carnea
Melanoleuca polioleuca
Entoloma sericeum
Stropharia caerulea
Clavulinopsis helvola*[Jill also declared one sample as C. luteoalba after microscopy]

Hygrocybe psittacina

and on my first visit several clumps of Coprinus commatus and C. atramentarius were noted.

Lyophyllum decastes

The tree cover in the cemetery is mildly disappointing. About 90% is sycamore with a handful of poplar, horse chestnut etc.--we did find a vast swathe of Hypholoma fasciculare [Sulphur Tuft] on mainly buried wood of sycamore.

Other fungi present were Clavaria fragilis, Lacrymaria lacrymabunda, Lycoperdon lividum, Parasola plicatilis, Agaricus campestris, Clitocybe dealbata, Mycena sp., Cortinarius sp., Inocybe sp.

And who knows what else was there earlier in the autumn.

I have duly recorded the list of fungi and passed it [via Martin Allen] to the powers that be at Middlesbrough Council together with a conservation prescription.

Clavulinopsis helvola

Footnote—Emboldened by this experience I was encouraged to climb over the wall at the bottom of my garden into the Victorian Redcar Cemetery—lo and behold, lots of clumps of Psathyrella multipedata, troops of Lepista saeva, rings of Clitocybe dealbata, and several Hygrocybe species—chlorophana [no smell!], virginea, ceracea— Clavulinopsis helvola, Calocybe carnea, Melanoleuca polioleuca, and 2 Agaricus species.

Alan Simkins (Photos Jill Cunningham and Martin Allen)

Get your nose to this resupinate!

Scytinostroma portentosum, Mothball Crust – and yes, it does really smell of naphthalene, even days after and when samples are dry! Look out for a creamy, +/- with rosy tints, smooth/waxy, thin, leathery patches on older broad-leaved trunks. It was first recorded in Norfolk in 1998 and most of the 55 records on NBN atlas are around London plus 2 in Aberdeen. Doug and Lydia Koelmans found it in Acomb in the spring of this year and this was the most Northerly record on CATE 2 by some way. At the recent Gosforth Nature Reserve meet Lydia pointed out a mystery corticioid. Only later did we both notice that the samples had a strong smell of Moth Balls. Thank goodness for English names – Buczacki has a 'Mothball Crust', (recorded under its synonym, s. hemidichophyticum, in the 'Resupinates of Hampshire'), that got us to the likely ID. A second go at the spore hunt – 3 days on a slide in a damp box, got a clear spore match, (globular with a germ pore, hyaline, and 4-7*um*). One to look, (smell), out for!

Lydia Koelmans + Jill Cunningham.

Supercharged mushrooms

Photo *Wikipedia*

For centuries it has been noted that shiitake mushrooms fruit better after thunderstorms--now research has provided proof. Using high voltage to simulate lightning researchers in Japan found the shiitake harvest from log beds subjected to indirect "lightning strikes" was double that of those without. It is thought that disruption of fungal hyphae caused by the electricity may stimulate mushroom formation.

Short report from RHS The Garden magazine

Spotting Plum Fruit Problems

Fungal infections can severely affect the number and quality of fruits on plum trees. A disease called Brown Rot most commonly caused by the fungus Monilinia fructigena [but also Monilinia laxa] causes fruit to decay rapidly. Concentric rings of buff-brown spore pustules develop in late summer and autumn. When the infection level is high fruit can shrivel and stay on the tree--the mummified remains are themselves an extra source of infection. In spring these fungi also cause blossom wilt which causes flowers to wilt and brown so that they fail to develop and produce fruit. FOTE [Fungi of Temperate Europe] describes these as "asexual mould like structures [hyphomycetous fungi] which produce conidia from exposed loose hyphae. Monilinia fructigena may on rare occasions produce brown apothecia. The asexual state [Monilia fructigena] is extremely abundant on pome fruits, e.g. Malus, where it forms circular rings of buff spore producing hyphae on rotten brown parts of the fruit [forms a yellow monilia]. The spores from the asci measure 9-11[-13] x 5-6.6 microns; the conidia measure 15-25x 12-16 microns. The closely related Monilinia laxa mainly attacks stone fruit, e.g. cherries and plums, and forms a grey monilia. Widespread and common, all year."

Monilinia fructigena Photo Wikipedia

Taphrina pruni Photo Jo Scott

Another common disease of plums is Pocket Plum caused by the fungus Taphrina pruni which infects developing fruitlets, the growth of which becomes distorted--resulting in plums which are elongated, shrivelled and stoneless.

FOTE" describes species in the order Taphrinales as all being biotrophic plant parasites that never form proper fruitbodies, but mostly produce a layer of asci within the host tissue. All belong in Taphrinamycotina--one of 3 subphyla withn the phylum Ascomycota. Taphrina is a large genus. All species deform the infected tissue in more or less spectacular ways, from curly or blistered leaves, through deforming fruits, to inducing "witches brooms". The small asci are formed in a palisade directly on the surface of the host tissue. Taphrina pruni transforms young plums into oblong, flat, clavate, greenish to reddish galls that when sporulating become covered by a pruinose surface. The spores measure 6-8x4-6 microns."

Distribution of spores happens in various ways--by means of wind and rain--there are also numerous insects [wasps, beetles, flies, butterflies] that are recognised as vectors of Monilinia and Taphrina spp. Birds wounding the tree or its fruits also allow the fungi to enter the host.

Article from RHS The Garden Magazine

Guepinia helvelloides [Tremiscus Helvelloides in FOTE]

I was walking one day in early September in a remote area of Forestry Commission woodland south of Goathland in the North York Moors--as one does. I had halted at a junction of forest tracks not sure which way to go [this can happen frequently in such places as neither of the tracks was on my O.S. map] when I spotted some clumps of rosy pink material in one of the trackside verges. They reminded me a little of Otidea species in form but I didn't recall anything of this colour in that genus. I collected a specimen to check in my books later.

My books threw no light on the subject so I resolved to take the fungus to the next NEFSG foray [at Druridge Bay] to seek help. Luckily Rhona and John Sutherland were there and immediately said that it was a Guepinia helvelloides which they had often seen on holidays in Switzerland. Guepinia was a genus I had not encountered before and I suspect the same applies to most members of NEFSG.

The fungus drew admiring comments from all the forayers present [those present will remember that there was a dearth of other fungi at Druridge that day!] and photographs were duly taken. On my return home out came the books again and I learned that the name Guepinia had been superceded by Tremiscus--and here is the description of it:

Funnel to tongue shaped jelly fungi with longitudinally divided basidia

Tremiscus helvelloides is a funnel-shaped pink to orange rather firm and thick fleshed jelly fungus with a pale short stem and an initially smooth, but later wrinkled hymenophore. The basidia are longitudinally divided and 2-4 spored. The ellipsoid repeating spores measure 15-17.5 x 11-012.5 microns. Occurs on conifer wood, mostly sawdust,wood chips or more or less buried sticks in damp, typically calcareous sites e.g. road sides in forests. It is probably native to the Alpine region or boreal areas but it has found its way to the nemoral zones maybe by imported timber. A very distinctive species that is unlikely to be misidentified. The generic name Guepinia is also in use but this is an older name for a genus of plants in the Brassicaceae. Widespread but rather rare and apparently spreading, mainly August to November.

So there it is--a somewhat rare, exotic species probably imported with trees planted on Forestry Commission plantations--talking to Gordon Simpson later it appears that there are other sites in North York Moors plantations, and also at Kielder Forest where this spectacular fungus has been found.

To conclude I have subsequently informed the local Forestry Commission ecologist of the location of this fungus and the desirability of protecting it when forestry operations are taking place. I am told that it has been added to the conservation list for this site.

P.S. This fungus is apparently quite long-lived--Paul Forster went to the site about a month after I had first seen it and it was still there.

Alan Simkins (photo Mike Cruz)

‘As Flies to Wanton Boys’[1]: A visit from *Entomophthora muscae*

Keith Tulip

Figure 2: position on the study window (microscope in foreground)

You don’t need forays. Sometimes they come to you. Stuck to the study window, two feet from where the microscope lives.

With spores sprayed all around the victim, the suspect was immediately the fungus *Entomophthora muscae*. On checking in the *livre du jour*, *Fungi of Temperate Europe*, the description fits very well, but with the warning: ‘a range of similar species and genera can occur on *Diptera*, and identification requires specialist literature’ (Læssøe & Petersen 2019). So off we go.

In Keller (1999), *E. muscae* is described as a species complex, differentiated by the number and size of the nuclei within a conidium (which would challenge the techniques of this field mycologist). A Danish study (Jensen 2006) recognizes six species in the complex. All are in *Species Fungorum* (Kirk 2021). However, only two are in the FRDBI, and CATE2 has only *muscae*.

Of the six, *E. grandis* and *syrphi* are only known from hoverflies (Jensen 2006). The conidia of *E. scatophagae* appear yellowish (Keller 1999), and this species is only known on the dung fly *Scatophaga stercoraria* (Jensen 2006). *E. ferdinandii* is found on smaller flies such as *Drosophila* and has not been found to infect *Musca domestica* in the wild, although it has been induced to do so in the laboratory. *E. muscae*, now more closely defined, and *schizophorae* both infect *Musca domestica*, but have different sizes of conidia (Keller 2002).

Figure 1: from outside

Our conidia measured on average 26.1 x 22.4 µm. These seemed small, but even in 1892, Mordecai Cubitt Cooke described how there were both primary conidia with a pointed apex, and smaller, secondary conidia, budding directly from the primary, and more rounded at the apex. My sample seems to be a mixture of both (see fig. 5). Averaging the sizes in Keller (2002) gives primary conidia as 29 x 22.3 and secondary as 21.8 x 17.1 for *E. muscae s.s.*. For *E. schizophorae* the figures are primary 20 x 16 and secondary 15.8 x 12.6. So at the end, our specimen was still *Entomophthora muscae*, now both in the widest sense (*sensu lato (s.l.)*, the species complex) and in the strictest (*sensu stricto (s.s.)*).

[1] As flies to wanton boys, are we to the gods;
They kill us for their sport.
King Lear

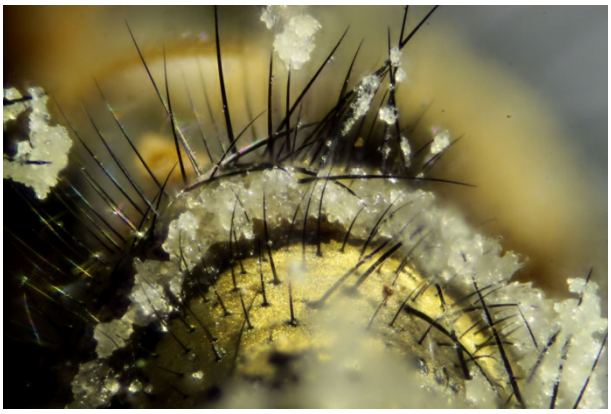

Figure 3: conidia growing from conidiophores protuding from intersegmental areas of the abdomen

Figure 4: attachment by the proboscis

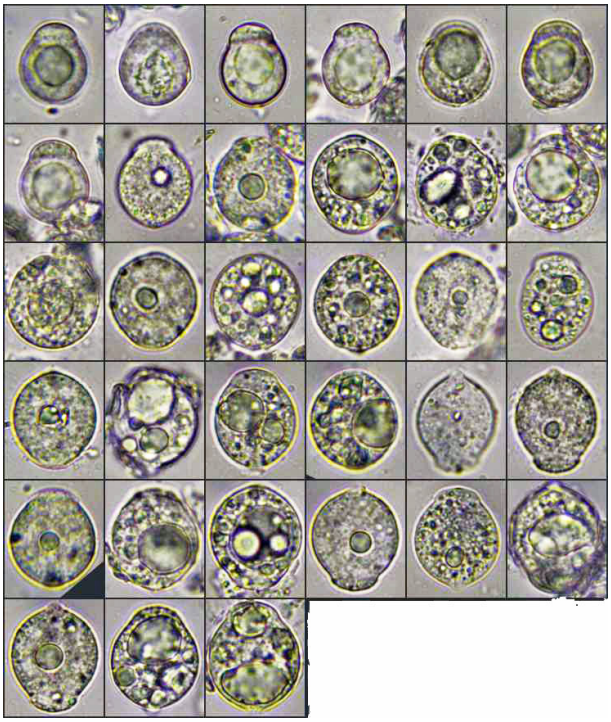

Figure 5: conidia
21.7 [25.4 ; 26.9] 30.5 × 17.9 [21.6 ; 23.2] 26.9 µm
Q = 1.1 [1.15 ; 1.2] 1.3 ; N = 33 ; C = 95%
Mean = 26.1 × 22.4 µm ; Qe = 1.2

The life cycle of *E. muscae s.l.* is described in Samson (1988) and Mahr (2006). After infecting the host, airborne conidia are produced to infect other flies. The infection can also be a sexually transmitted disease. Male flies are attracted to dead females and can pick up conidia when attempting to mate with the corpse. They can then pass them on in a similar manner to live females.

Subsequently, in autumn, resting spores may be produced, which fall to the ground and overwinter. Flies emerging from the soil are thus infected. However, the production of resting spores in *E. schizophorae* and *E. muscae* s.s. has not been detected (Thomsen *et al* 2001). The authors hypothesise that these species have lost this capability, as cold periods are not experienced in the stables and poultry facilities where the flies are present all year round.

Flies producing conidia typically die in elevated positions, proboscis extended and attached, legs spread, abdomen raised, and wings raised and parted away from the thorax. But if resting spores are produced, the fly dies on the soil surface. Thus the fungus must modify the behaviour of the host in two entirely different ways: moving the fly upwards, exposed, to disperse the conidia ('summit disease'); or sending it downwards, for resting-spores to ultimately infect flies from soil-based pupae.

This modification of host behaviour by the fungus has led to some interesting research on the mechanism. Other entomopathogenic species have been shown to release behaviour-modifying drugs such as amphetamines and psilocybins (Boyce 2019). Another most interesting possibility has been raised by Coyle *et al* (2018). They have discovered a virus in *E. muscae* that is also present in high levels in the infected flies. Other species in the virus family of this Entomophthovirus, as they call it, cause behavioural changes in insects, and they speculate that this virus is essential to the processes needed for successful transmission of the fungal infection.

Such is a brief account of the troubles of a fly, which, having partaken of our choicest dainties uninvited, sipped our divine nectar, stolen our sugar, and escaped the perils of the milk jug, at last pays the penalty of nature, by exchanging the gambols of a merry life for the tetanic embraces of a mouldy death.
W.M.B (1865)

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Thomsen *et al* (2001), 'Formation and germination of resting spores from different strains from the *Entomophthora muscae* complex produced in *Musca domestica*', *Canadian Journal of Botany* 79: 1076-1082 February 2001, URL: https://www.researchgate.net/publication/237154679_Formation_and_germination_of_resting_spores_from_different_strains_from_the_Entomophthora_muscae_complex_produced_in_Musca_domestica

all photographs by the author.

Helminthosphaeria clavariarum

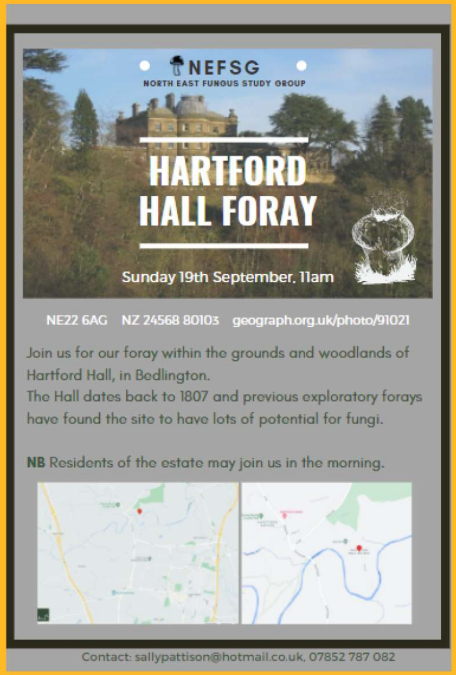
A Parasite of *Clavulina*

HARTFORD HALL MYSTERY

By Sally Pattison

At our Hartford Hall foray in mid-September, we came across a coral fungus along the river path.
By the afternoon, many of our number had left as the morning site had proved dry and unfruitful, so our number was down to three.
The fungus looked unusual to us - Doug, Mike and I - and we weren't quite sure what to identify it as.
It was a bit of a mystery.

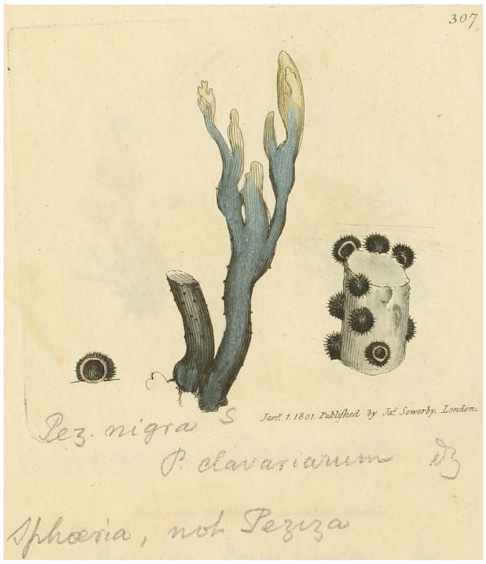
In November, by chance, I came across a post on the BMS facebook page about a fungus that parasitises *Clavulina* species - could this be the reason why our coral looked so strange?



These images were taken by Mike and show the grey/blue-black discolouration on *Clavulina coralloides*.

AN ASCOMYCOTA

that attacks *Clavulina coralloides* and *Clavulina cinerea*



These images from wiki commons demonstrate how obvious the colour change can be on the fruitbodies of the *Clavulina* when infected by the parasite.

This is certainly something I think I have seen before without realising that I was looking at 2 fungi.

We can't know for sure that *Helminthosphaeria clavariarum* was infecting the Hartford Hall fungus but it seems possible in retrospect.
If you do find a strange looking coral fungus, don't forget to look out for this interesting ascomyces that may be infecting it.

5 SITES ON FUNGI AND CLIMATE CHANGE

Four Things to Know about Fungi "Climate Warriors" | The ...

https://www.bu.edu/articles/2018/4-things-to-know-about-fungi-climate-warriors

03/08/2018 · BU researchers explain how fungi fight climate change. Certain fungi play an important role in how well forests can absorb carbon dioxide. Two Boston University researchers, Colin Averill and Jennifer M. Bhatnagar, explain below how these fungi fit into forest microbiome and fight climate change, as well as how we can safeguard them for the future

The secret life of fungi: how they use ... - The Conversation

https://theconversation.com/the-secret-life-of-fungi-how-they-use..

.....fungal hyphae appear to be ingenious subterranean foragers. And our findings aren't merely fascinating: they may have important implications for our fight against climate change, too.

Microorganisms | Free Full-Text | Uphill Shifts of Fungal ...

https://www.mdpi.com/2076-2607/9/9/1892/htm

The manuscript evaluates the altitude of fruiting of 66 different fungal species on a large transect of Slantsevaya Mountain, Polar Urals, over the past 60 years. For the majority of fungal species, their mean altitude of fruiting increased continuously over the past 60 years. The fungal species studied can be grouped into mycorrhizal and both litter and wood saprobic fungi. Despite of species heterogeneity, also the fruiting elevation of trophic groups increased significantly over time.The study is interesting, well conducted, convincing and presents valuable data on the ecological effect of warming on fungal distribution patterns.

Forest fungi and their implications for a warming planet ...

https://environment-review.yale.edu/forest-fungi-and-their...

06/03/2018 · Fungi live in their own world of war and peace, their competition unknowingly playing a major role in global climate change.

Fungi in a warmer world – research project will explore ...

https://www.northumbria.ac.uk/about-us/news-events/news/fungi-in-a...

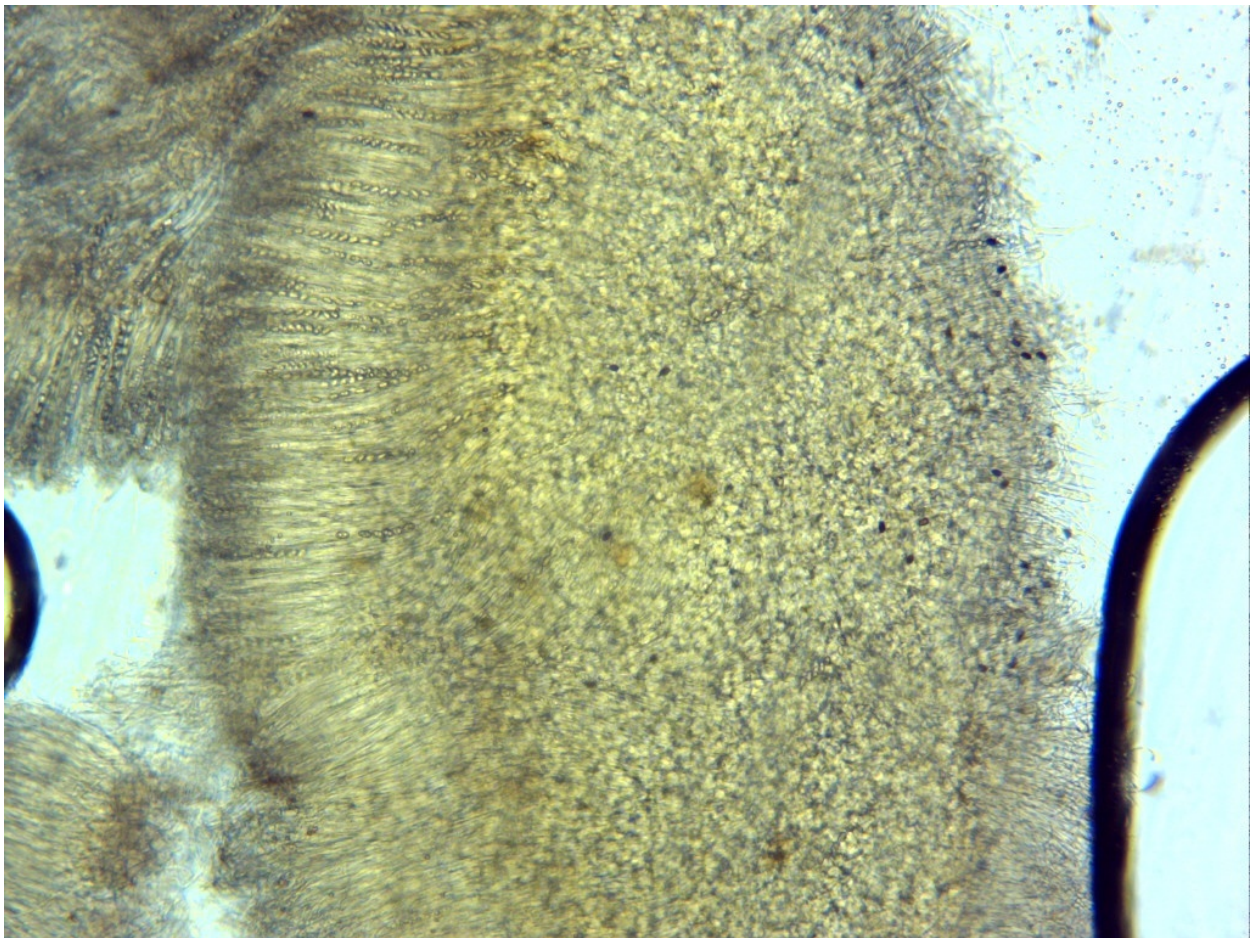
22nd September 2020. Scientists from universities in the UK, US and Argentina are joining forces in a $1m research project to discover what impact an increase in global temperatures could have on the millions of species of fungi around the world. Fungi play an important role in controlling the amount of carbon in the atmosphere, with some species absorbing carbon while others release it

Mike Cruse

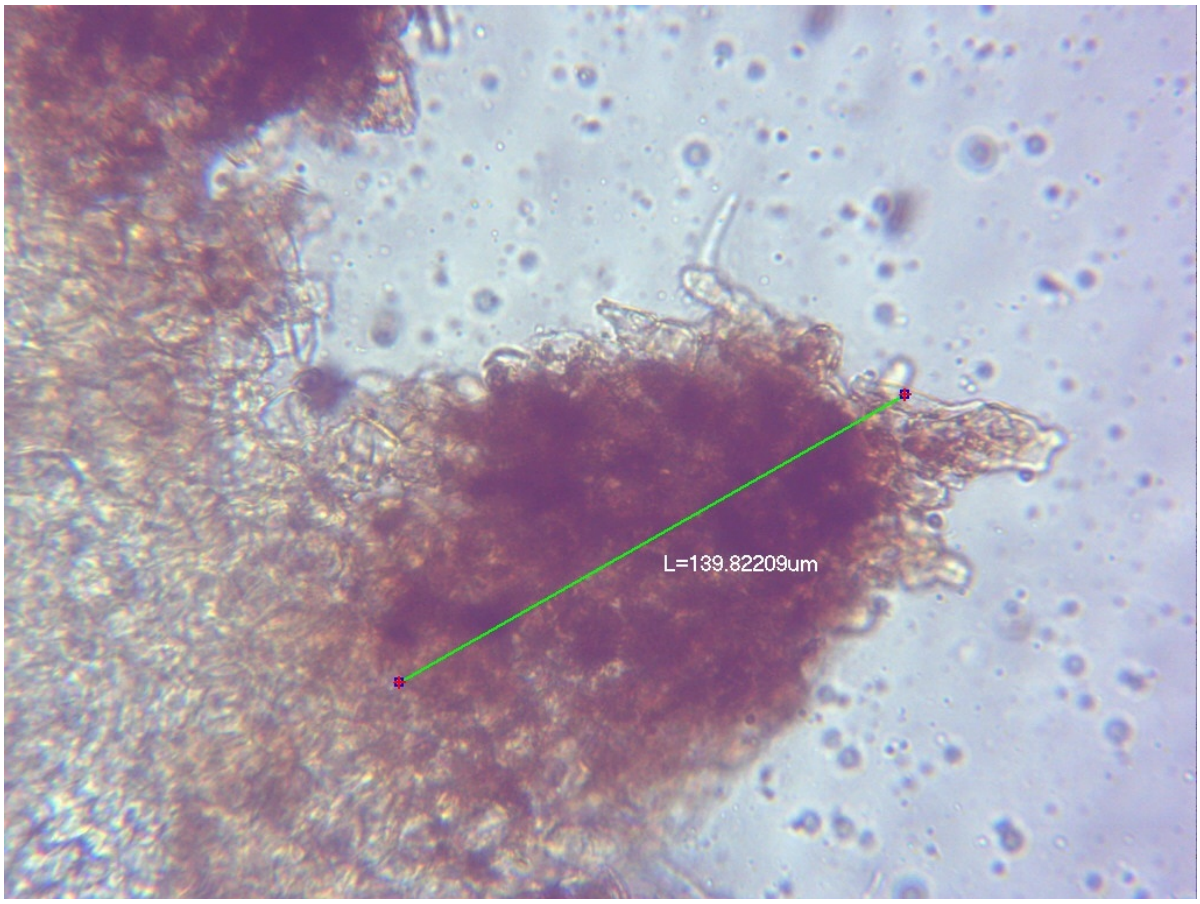
Otidia tuomikoskii in litter of mature Picea abies

Close up of warty ventral surface

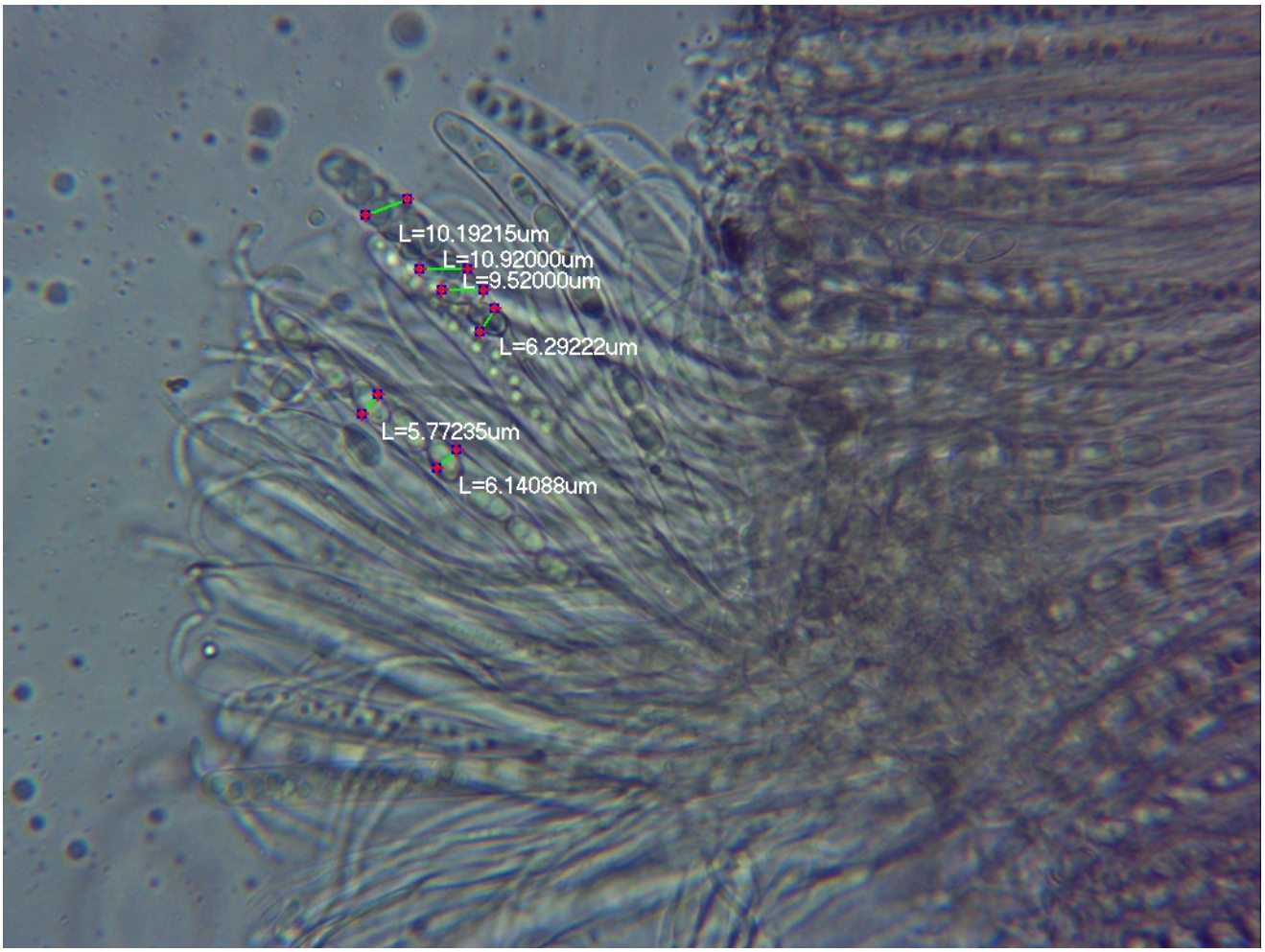
Hymenium + yellow in KOH



Warts 125-140 microns



Spores asci etc. Spores 9.5-11 x c 6



Literature referred to: Fungi of Temperate Europe page 1302
A Monograph of Otidea. Oloriaga et. al. 2015

Hamsterly Forest November 4th 2021
Narrow stand of Picea abies West edge of forest track
NZ0527 VC66 245m
Collector Gordon Simpson
Det. Doug. McCutcheon
Conf. Dr. Paul Cannon Kew

Gordon is a founder member of the NEFSG and has his name attributed to an astonishing number of species on Cate2 around 19,000 and has obviously not last the knack of finding rare species as this is only the 2nd for England and the 5th in total for the UK and will be a 1st for Cate2 so well done Gordon!.
Keep a sharp eye out for it under Norway spruce in the Autumn as it mingles well with litter on the woodland floor and is not easy to spot.

Lichen Lookout

Lichens to look out for at the coast.

Verrucaria mucosa

A beautiful rich emerald green colour especially when wet. With a white prothallus (*around the edge*) In the mid to low shore on rocks on exposed shores. Small black perithecia may be present sunk into the thallus.

Ramalina siliquosa

Found on rocks and walls above high water. Strap like branched thallus with large apothecia. Pale grey/green in colour. Also known as Sea Ivory.

Verrucaria maura

Black tar like thallus with a mosaic of cracks. Can encrust large area of rock on the upper shore down to the splash zone.