North Eastern Fungus Study Group

Newsletter No 104 Spring 2022

Index

NEXT ISSUE: The deadline for articles for the Summer newsletter is 26th August 2022
All contributions will be gratefully received!

Forthcoming Events

Meet at 10:30am for an 11am start.

Sat July 2nd	LUNCH	Durham
Sat July 31st	Mike Cruse	Kings Law, Whitley Chapel, Hexhamshire, South Northumberland
Sun Aug 6th	Louise Watson	Tunstall Reservoir, Wolsingham, Weardale, County Durham
Sat Aug 20th	Gabi Recknagel /Mike Cruse	Sweethope Lough, Knowesgate, Mid Northumberland
Sat Sept 3rd	Lydia Koelmans	Hindhope Linn, Rochester, Redesdale, North Northumberland
Sat Sept 10th	Louise Watson	Twizell Wood, Chester-le-Street, County Durham
Sun Sept 18th	Alan Simkins	Middleton-in-Teesdale, Upper Teesdale, County Durham
Sat Sept 24th		Week-end away in Scotland (poss incl Fri 23rd – Mon 26th)
Sat Oct 1st	Cath Gillie	Bedburn, Hamsterley, County Durham
Sun Oct 2nd	Alan Simkins	Guisborough Woods, Guisborough, North Yorkshire NP
Sat Oct 8th	Mike Cruse	Featherstone Castle, Haltwhistle, West Northumberland
Sun Oct 9th	Ron Pattinson	East Chevington Widdrington, South Northumberland
Sat Oct 15th	Sally Pattison	UK fungus Day, Morpeth, South Northumberland
Sun Oct 16th	Lydia Koelmans	Scotch Gill, Morpeth, South Northumberland
Sun Oct 23rd	David Miller	Bonfield Ghyll, Bilsdale East Moor, North Yorkshire Moors NP

Sat Oct 29th	Louise Watson	Oakenshaw, Brandon, County Durham
Sat Nov 5th	Doug McCutcheon	Westernhopeburn Farm, Eastgate, Weardale, County Durham
Sat Nov 12th	Alan Simkins	Keldy Castle, Cropton, North Yorkshire Moors NP
Sun Nov 13th	Rhona Sutherland	Kirkdale, Nawton, North Yorkshire Moors NP
Sat Nov 26th	David Miller	Beaconhill, White Lea Farm, Easington Coll. County Durham
Sat Dec 3rd	Mike Cruse	Warkworth Dunes, Warkworth, Mid Northumberland

Saturday July 2nd Lunch

This year we will meet for lunch at the Kings Lodge Inn in Durham City and then foray around Flass Vale.

Meet at 11.30 for 12.30pm. There should be ample parking in the car park - otherwise park on Waddington Street. DH14BG.

Please let me know if you will attend and I will then send round the menu as we need to pre-book our orders.

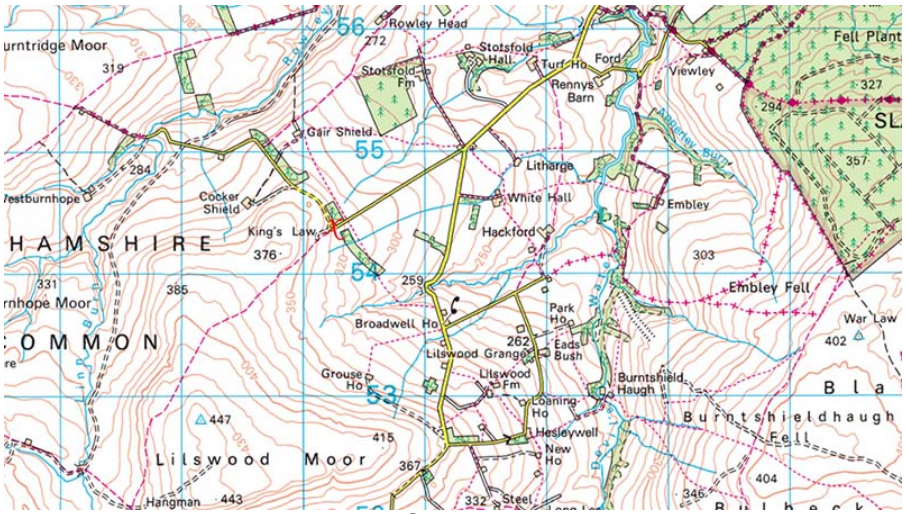
Val Standen valerie.standen@hotmail.co.uk

Sunday July 31st , King's Law , Whitley Chapel , Hexhamshire Leader :- Mike Cruse

Grid ref :- NY 902 543 ; Nearest postcode NE47 0JF (Whitley Chapel)

A variety of habitats ; a boggy area , woodland edge , grassland and heathland .

Access can only be made from Whitley Chapel , 5 miles south of Hexham . Driving south from Whitley Chapel and forking right after 2 miles . A further 1 mile and just after a 90* bend is King's Law Plantation , park on the sandy area by the side of the road . Whitley Chapel can be accessed from the south and east from the A68 via Slaley and from the north and west via Hexham .



Whitley Chapel by Trevor Littlewood
geograph for square NY9257 *Dist:0.4km*

The small Northumberland village of **Whitley Chapel** as seen from the entrance to the graveyard around St. Helen's Church

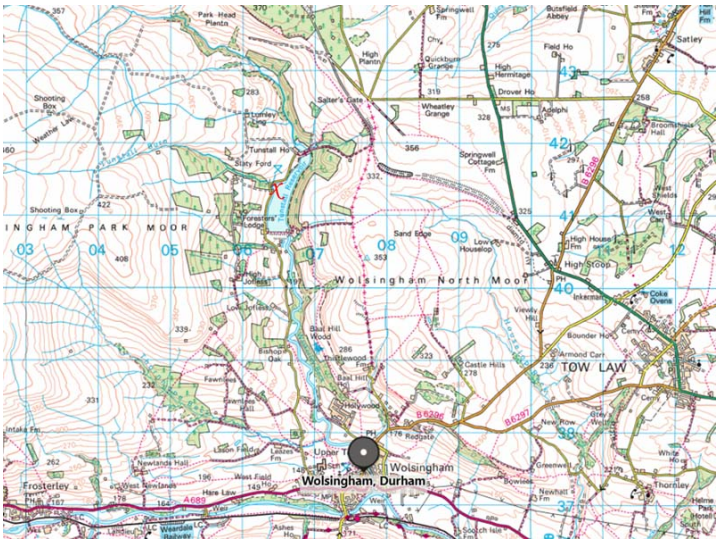
Field boundary near King's Law by Les Hull
geograph for square NY9054 *Dist:4.0km south-southwest*

Field boundary near **King's Law** Category: Field boundaries

mikecruse@live.com tel:- 01661 823229 mob (on the day only) :- 07748276183

August 6th - Tunstall Reservoir Wolsingham - Leader Louise Watson

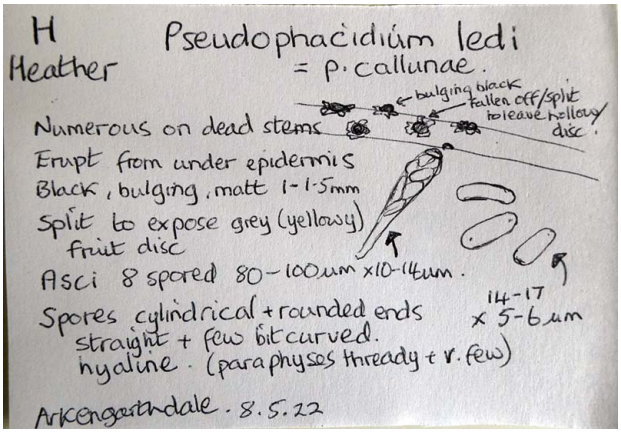
The Tunstall Reservoir foray is at grid reference NZ0663 4132. Turn off in Wolsingham, by the school, follow the road right down to the end, there's a little car park by the boat shed. Some of the woodland is rather rough terrain.



Saturday 20th August – Sweethope Lough, Knowesgate
Saturday 3rd September – Hindhope Linn
Details by e-mail.

Out and About

I found some fungus-looking tiny black lumps on dead heather stems during the Lichen meet at Arkengarthdale - and thought they would be too old/difficult to get anything from - but the slide productive, and the ID search fairly short. Ellis and Ellis gave *pseudophacidium callunae* as the only likely candidate and the pilbestimmer website info confirmed it but renamed as *p. ledi*. photo of sample + note.



Had an amble round Langthwaite village and noted lots of Sweet Ciceley plants distorted with the rust puccinia chaerophylli. It is often also found on Cow Parsley at this time of year.

Spotted red bulgy areas on Almond leaves in a Darlington garden - pah, the biggest bulgy ones were too high up - but grabbed and photo'd the best I could reach. It is caused by *taphrina deformans* - 'Peach Leaf Fungus' and not a common find up here. (The fruit is only there to show that it's Almond).

Jill Cunningham

Do members think that climate change is affecting mycology?

In my locale the St George Mushroom tended to appear nearer to 3 weeks later than St Georges day, anywhere from 8th to 20 something of May. However I haven't found any in my usual spots for several recent years. Given the forecast for the next few weeks of minimal rain I am not holding much hope. Any other members finding (or not) a similar situation?
Example is that spring moves north at 2mph (ref: How fast does spring travel? About 2mph according to Nature's Calendar | British Science Association)
or approx. 50 miles per day, then in theory just a week later for "up north"!
The wild garlic is now in flower, it would be nice to fry up a few St Georges with it!
Sadly I have never found any morels.
I am booked for a holiday in Ayrshire/Galloway for late September and hope a few chanterelles will be about. My last trip a few years back provided some, and ceps, and hedgehog.

Climate change: Spring egg-laying shifts by three weeks
https://www.bbc.co.uk/news/science-environment-61314226

Jon Bemrose

My Reflections on the formation of the NEFSG

I retired in 1993 after almost 40 years with the Forestry Commission. I was very surprised that my wife did not want to move back to Brandon, Suffolk where she was born. She wanted to move to Pickering amongst the gentle, rolling hills so we put our house up for sale.

Around this time Alan Legg, a member of British Mycological Society (BMS), must have received a suggestion from the BMS that local Fungus Study Groups should be formed. Alan contacted me and asked if I would be the chairman of his group. As I hoped to move to Pickering and my wife was an invalid I turned down his request because I expected I would be busy. My house at West Auckland did not attract a buyer, in fact no houses on the estate sold at this time. I then started to help Alan by which time he had recruited Tom Kirby as a treasurer and Babs Walton as a recorder to form a group. Progress was slow due to Tom and Babs still being in full time work. We occasionally had a meeting at Tom's house at a disused railway siding near Stillington. Tom was a 'masterchef' and did all the cooking for himself and his wife Ann. At his house we were well fed, oftenwith home grown vegetables. Tom always kept a dog, usually a young, energetic black Labrador. I got the impression Alan and Tom had attended the same secondary school. Babs had taken part in a series of English lessons organised by Alan, an English teacher. Meetings were few and far between and a major problem took up most of the time with the first meetings. Alan had several peculiar views which needed to be changed. He did not like children yet they were our future. He hated dogs. He did not want forays in Yorkshire because Yorkshire had such a huge number of fungus records so future Yorkshire members had to travel to County Durham. He had difficulty in identifying plants. His West Cemetery, Darlington fungus records were impressive.When Darlington Council asked me to run a fungus foray for them in West Cemetery Alan was far from being impressed. We paid a preliminary visit to the cemetery and he showed me some of his wonderful finds and asked me to take great care of them. Tom's forays for his motor club friends were around Keldy, Sutherland Lodge and Black Park in Cropton Forest. I helped Babs survey Stodoe Farm's wildlife. Paul Foster was added to the group as a recorder to help Babs. I recorded all my own finds which totalled more than the recordsby other members. All the records were sent to the BMS. The BMS added my name to Alan Leggs as the recorder. Babs specialised in minute spots hardly visible to the naked eye. In1964 I was the assistant forester at Pickering Forest in Newton Dale east of the scattered farming hamlet of Stape. The Yorkshire Naturalists' Union asked if they could arrange a visit to Newton Dale. I was asked to deal with the request. At this meeting I met Willis Bramley who lived at Pickering. He was a noted mycologist and he had recently retired from his farm at Fairburn Ings. This farm is now a wetland Yorkshire Wildlife Trust reserve as the farm has subsided and is now flooded due to colliery subsidence. Willis spent a lot of time with me helping me identify fungi. He said, 'If you can identify 15 species of toadstools after one year you are doing fine'. I eventually ran forays from Amble to Mid Yorkshire. The latter were for the Farming and Wildlife Advisory Group (FWAG). It was at Tom's and my forays that recruitment of new NEFSG members were made. Eventually we had recruited sufficient members to have our own NEFSG forays in 1997 but due to Alan's rules most were in County Durham . At our forays I moved a short distance from the meeting point then prospective members would bring a toadstool to me for identification. I hardly moved from this point as more fungi were brought to me. I remember helping Alan Bunn from Great Ayton. He started his own forays around Great Ayton. Another prominent new member was Dr Aubrey Colling who often brought his wife Edith with him. He frequently sent me photographs taken down his microscope and he just wanted confirmation that his identification was correct. David Smith was a new member. A lady from the Yorkshire Dales resigned because we did not have forays in her area. Tom was a great character and he and his wife Ann organised annual dinners. The first one was in Yorkshire but I cannot recollect the name of the inn. The second annual meal was on 31 May 2003 at Pinchinthorpe Hall. Guisbrough. See the attached photograph showing a few members, Dr Aubrey and Edith Colling, Myself getting my eyebrows singed by a candle, David Smith and his wife, Alan Bunn and his wife and Alan Legg. After the meal we spent

some time in the gardens. I pointed out Butcher's Broom *Ruscusaculeatus.* Much to Alan's delight. He searched the plant and found a fungus on dead cladodes. It was*Paraphaeosphaeriaglaucopunctata*.

During my fungus forays at several Kielder and Chopwell sites Dominic, the Earpickfungus kid, Keith, Mike, Ron and others joined my walks. They rightly stated the fungus group was Durham Fungus group. After a few years as chairman I handed the job over to Alan Simkins on 6 Mar 2010. I discussed with him that forays should be in N Yorkshire, Durham and Northumberland. At his handover he suggested there should be 2 forays at the three county sites plus others anywhere. From 2010 onwards the society increased its membership dramatically.

Gordon Simpson

25 Years of the NEFSG

The NEFSG (North East Fungus Study Group) was formed in 1997 by Alan Legg and was based around Darlington and surrounding area.

Separately those interested in fungi further north attended Gordon Beake's adult education courses held at Newcastle University with evening sessions and w/e forays . Difficulties with government funding meant this disbanded in 2008 , but Gordon kept us informed of local forays we could attend . Around this time the NEFSG was keen on expanding to include members further north , so through Gordon , myself , Dom Colback , Keith Tulip and Ron Pattinson were invited to be members for the 2010 season .

One of Gordon's particularly favourite sites is Allen Banks , where many class forays were held and continue now with annual public forays for the National Trust , paying events . The 4 of us have attended annually , the site being excellent , known locally as 'Amanita Valley' .

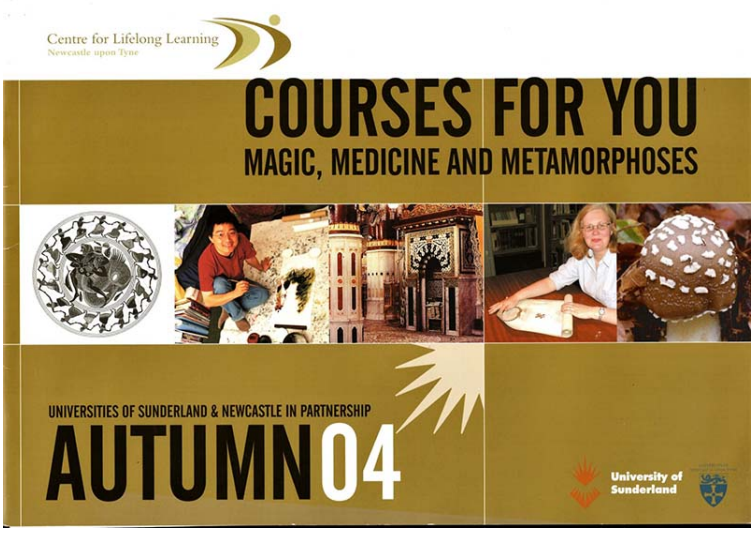
I attended my 1st fungi course with Gordon in 1995 and didn't miss a year till they ceased to exist . It was in 1995 when Gordon was ill and couldn't lead the foray that the course members led ourselves and found in Briarwood Banks a stunning display of the exquisite Panthercap , *Amanita pantherina* . My photo from there adorns the 2004 courses brochure , sadly , despite many return visits over the years , I never found it again at that location , but it has been recorded elsewhere in Allen Banks .

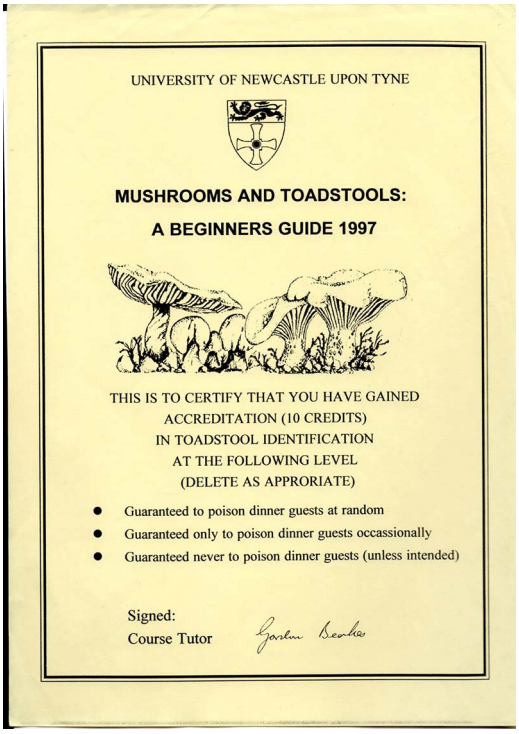
No public foray in 2021 but the 5 of us gathered for the annual event .

It would be good if more of the history of the NEFSG was forthcoming in 2022 in this its 25th year . Perhaps reminiscences , favourite forays etc. from past members which could be included in the Newsletter over the year . Some celebratory events would also be welcome .

Members of the NEFSG may access past Newsletters on the website , there is a continuous record from January 2008 ,issue no. 47 till present issue no. 103 , Winter 2021 . There are a further 17 on the website covering 1997-2008 , the remaining 29 missing issues may be put on at some point . The Newsletters contain excellent articles etc. and thanks go to Jo Scott and previously Laura Long for editing them so well . Thanks also to John Robinson for setting up and running the website . Even non-members can check out the excellent photo contributions from members and the links to other sites are worth a look at too .

So watch this space or Newsletters in the coming year .





UNIVERSITY OF NEWCASTLE UPON TYNE

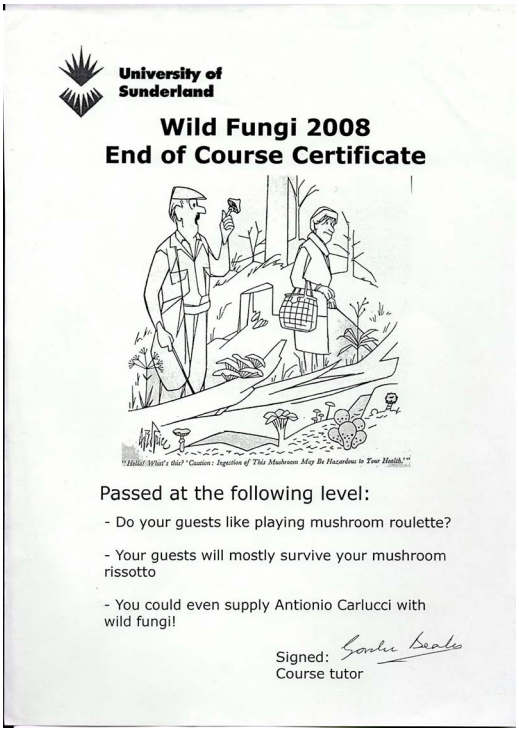
MUSHROOMS AND TOADSTOOLS:

A BEGINNERS GUIDE 1997

THIS IS TO CERTIFY THAT YOU HAVE GAINED
ACCREDITATION (10 CREDITS)
IN TOADSTOOL IDENTIFICATION
AT THE FOLLOWING LEVEL
(DELETE AS APPROPRIATE)

- Guaranteed to poison dinner guests at random
- Guaranteed only to poison dinner guests occassionally
- Guaranteed never to poison dinner guests (unless intended)

Signed:
Course Tutor



University of Sunderland

Wild Fungi 2008
End of Course Certificate

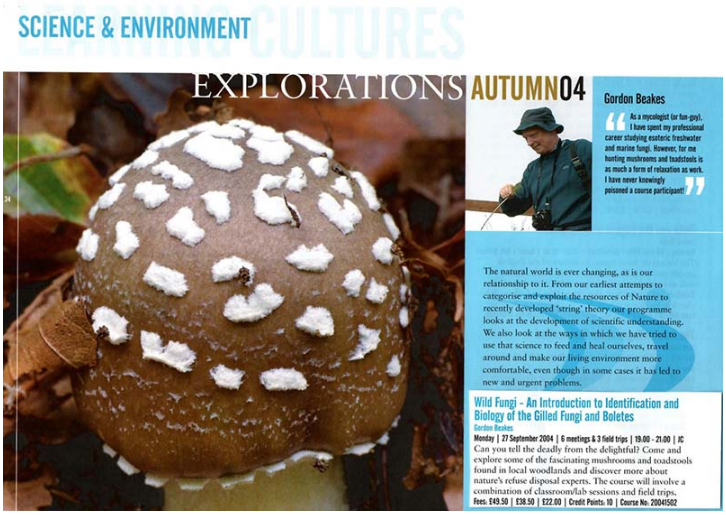
Passed at the following level:

- Do your guests like playing mushroom roulette?

- Your guests will mostly survive your mushroom rissotto

- You could even supply Antionio Carlucci with wild fungi!

Signed:
Course tutor



Mike Cruse

Claviceps

It was interesting to read Jill Cunningham's item in the winter 2021 newsletter about Claviceps purpurea and 3 closely related species on other host plants.

I have just stumbled across an article [see below] which describes the discovery of an early ancestor of modern Claviceps species found as a fossil in amber [itself a fossil] in Myanmar [Burma] and dated to early to mid Cretaceous times about 97 to 110 million years ago.

The fungus in this grass specimen, which is now extinct, was named Palaeoclaviceps parasiticus and is similar to Claviceps purpurea. The land was dominated by dinosaurs and conifers, but the earliest flowering plants, grasses and small mammals were beginning to evolve. The fossil shows a grass floret tipped by an ergot-type fruitbody.

This discovery helps us understand better the timeline of grass development, which now forms the basis of the human food supply in such crops as corn, rice, or wheat. But it also shows that this parasitic fungus may have been around almost as long as the grasses themselves, as both a toxin and natural hallucinogen. It would likely have been eaten by sauropod dinosaurs and one could wonder what effect it had on them!

I had always understood that grasses evolved in the Cretaceous but the article suggests that they may go back further--into Jurassic times.

Alan Simkins

One hundred million year old ergot: psychotropic compounds in theCretaceous?

GEORGE POINAR JR., STEPHEN ALDERMAN & JOERG WUNDERLICH

Abstract

A fungal sclerotium similar to those of the genus *Claviceps*, commonly known as ergot, was discovered infect- ing a grass floret in Early–mid Cretaceous Myanmar amber. The fungus, described as *Palaeoclaviceps parasiticus* gen. n., sp. n. is characterized by an erect black sclerotium with flattened hyphal outgrowths and adjacent conidia consistent in morphology with those of extant species of *Claviceps*. The lobed hyphal outgrowths on the distal end of the sclerotium separate the fossil from all extant species of *Claviceps* as well as other sclerotium- producing fungi in the Clavicipitaceae. The fossil shows that the original hosts of the Clavicipitaceae could have been grasses and establishes the presence of the Clavicipitaceae and Poaceae in the Early–mid Cretaceous.

Keywords: *Claviceps*, Early–mid Cretaceous grass, Ergot fossil, sclerotium, *Palaeoclaviceps parasiticus*, Myanmar amber.

1. Introduction

Few fungi have had a greater historical impact on soci- ety than ergot, the common name given to the sclerotia of fungi belonging to the genus *Claviceps* (BOVE 1970). The most common and well known of the *Claviceps* species is

C. purpurea, which parasitizes the unfertilized ovaries of rye, wheat and many other grasses, producing a dense tis- sue mass, the sclerotium, with a black to purple-black rind that often protrudes beyond the tip of the infected spike- let (BOVE 1970; LEWIS & ELVIN-LEWIS 1977). This parasitic association was described in detail by LUTTRELL (1980).

Ergot sclerotia contain hundreds of different com- pounds, some of which have been used to treat various human conditions, especially in relation to childbirth, migraines and psychiatric disturbances. Some ergot alka- loids however are quite poisonous and during periods of famine in the middle ages when the only bread available was made with ergot-infected grain (black grain bread), the heat-stable alkaloids caused a disease known as ergot- ism, resulting in delirium, convulsions, severe pain, gan- grenous limbs and death (BOVE 1970). Some 40,000 people died during an ergot epidemic in France in 994 AD and thousands died throughout the Middle Ages (LEWIS & ELVIN-LEWIS 1977). Human poisonings from ergot still occur (KING 1979), but the primary victims today are farm animals such as cattle, horses, pigs and poultry that eat the infested grains (KADA 2005). The most notorious compound isolated from ergot is lysergic acid diethyl- amide (LSD), which is used as a recreational hallucina- tory drug as well as a medicinal psychiatric drug (BOVE 1970; TAYLOR 1965). Ergot remains problematic in cereal and grass seed production as well as in pastures and graz- ing lands.

The present study describes the first fossil ergot fun- gus infecting an Early–mid Cretaceous grass in amber from Myanmar (Burma) and discusses its significance in deciphering the evolution of the Clavicipitaceae.

Acknowledgements

The authors thank ART BOUCOT and ROBERTA POINAR for their comments after reviewing the manuscript and ALFREDO DÔNIS for his critique of the manuscript.

2. Material and methods

The ergot infected grass floret is embedded in a rec- tangular piece of amber 12 mm long, 5 mm wide and 4 mm deep. The specimen originated from the Noije Bum 2001 Summit Site in the Hukawng Valley, southwest of Maingkhwan in the state of Kachin, Myanmar (26°20′N, 96°36′E). Amber-bearing strata in this mine were assigned to the Upper Albian (97–110 Ma) of the Early Cretaceous on the basis of paleontological (ammonite) evidence (CRUICKSHANK & KO 2003). Nuclear magnetic resonance (NMR) spectra and the presence of araucaroid wood fib- ers in amber samples from the Noije Bum 2001 Summit site indicate an araucarian tree source for the amber (POI- NAR et al. 2007). The Myanmar amber mines are on the Burma Plate (MITCHELL 1993), which is part of Laurasia, thus all inclusions are of Old World origin. Based on lith- ologic indicators, the habitat of the amber bearing region when the resin-producing trees were living some 100 mil- lion years ago was a tropical-subtropical forested area (BOUCOT et al. 2013).

Observations and photographs were made with a Nikon SMZ-10 R stereoscopic microscope and Nikon

Optiphot compound microscope with magnifications up to 600X. Helicon Focus Pro X64 was used to stack photos for better clarity and depth of field.

3. Description

Order Hypocreales

Family Clavicipitaceae

Genus *Palaeoclaviceps* nov.

Ty p e s p e c i e s : *Palaeoclaviceps parasiticus* gen. n., sp. n. POINAR, ALDERMAN & WUNDERLICH.

D i a g n o s i s : As for the type species (monotypic).

Palaeoclaviceps parasiticus g. n., sp. nov.
Figs. 1–6

Myc o B a n k n o . : MB810772.

E t y m o l o g y : The generic name is taken from the Greek "paleo" = ancient and *Claviceps*, an extant genusof ergot fungi.

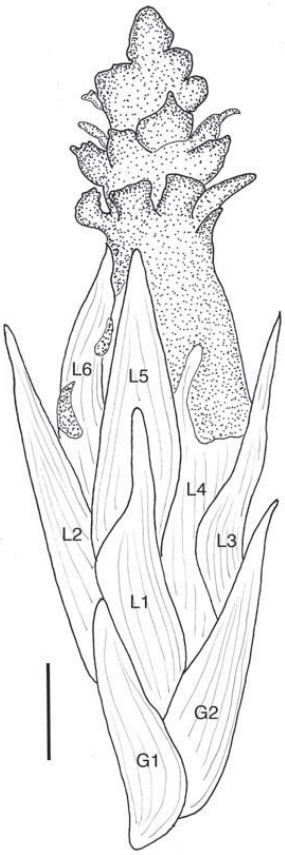


Fig. 1. Grass spikelet with attached sclerotium (arrow) of *Palae- oclaviceps parasiticus* gen. n., sp. n., holotype, F26481BUIC (excoll. WUNDERLICH) in Early–mid Cretaceous amber from Myan- mar. Bar = 1.6 mm.

Fig. 2. Drawing of grass spikelet with attached sclerotium (stippled region) of *Palaeoclaviceps parasiticus* gen. n., sp. n., holotype, F26481BUIC (ex coll. WUNDERLICH) in Early–mid Cre- taceous amber from Myanmar. G1= first glume, G2 = second glume, L1= first lemma, L2 = second lemma, L3 = third lemma, L4 = partial fourth lemma, L5 = fifth lemma, L6 = partial sixth lemma. Bar = 1.6 mm.

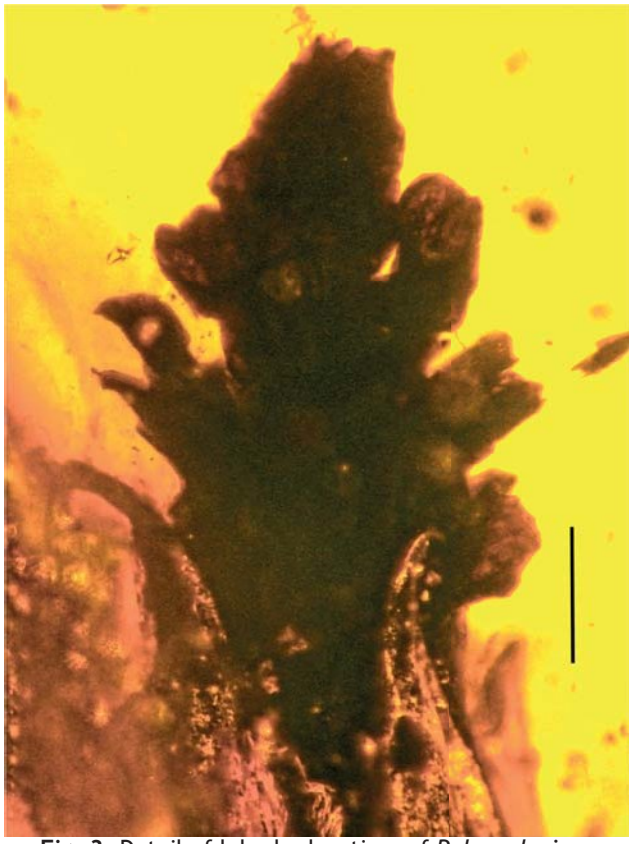


Fig. 3. Detail of lobed sclerotium of *Palaeoclaviceps parasiti- cus* gen. n., sp. n., holotype, F26481BUIC (ex coll. WUNDERLICH)in Early–mid Cretaceous amber from Myanmar. Bar = 0.5 mm.

Ty p e : Holotype presently deposited in the JOERG WUNDERLICH collection (F26481BUIC). At a later date, it will be deposited in the Senckenberg Museum and Research Institute, Frankfurt-am-Main, Germany.

Ty p e l o c a l i t y : Myanmar (Burma), state of Kachin, Noije Bum 2001 Summit Site amber mine in the Hukawng Valley, SW of Maingkhwan, 26°20′N, 96°36′E.

Di ag n o s i s : The erect, black sclerotium with flat- tened outgrowths of hyphal tissue and its presence in an Early–mid Cretaceous grass floret separate *Paleoclavi- ceps parasiticus* gen. n., sp. n. from all extant species of *Claviceps* as well as from other fungi in the Clavicipita- ceae (PAZOUTOVA 2002; ALDERMAN et al. 1999).

D e s c r i p t i o n : Length entire grass spikelet withsclerotium, 9.5 mm; sclerotium black, elongate, thick, protruding from infected floret, 5.6 mm in length; great- est width across sclerotium, 2.2 mm; sclerotium bear- ing flattened hyphal outgrowths (lobes) ranging from

0.3 mm to 1.0 mm in length and 0.2 mm to 0.6 mm in width; outgrowths composed of thick, branching, anas- tomosed hyphae; conidiophores hyaline, simple, septate, 11µm-14µm in length, bearing conidia terminally; conidia small, simple, hyaline, ovoid, 1-celled, 5µm - 8µm in length, distributed in a dense mass adjacent to the sclerotium.

Re m a r k s : The thick, branching, anastomosed hyphae in the sclerotial outgrowths of *Paleoclaviceps parasiticus* are similar to the arrangement of mycelium in developing sclerotia of extant *Claviceps purpurea* (FR.) TUL. (TAVEL 1892). The conidial mass adjacent to the fos- sil sclerotium is assumed to represent the “honey dew” droplets that in *Claviceps* spp. are comprised of conidia in a high sugar syrup produced during the early stages of ovary infection (Fig. 6) (MOWER & HANCOCK 1975). These

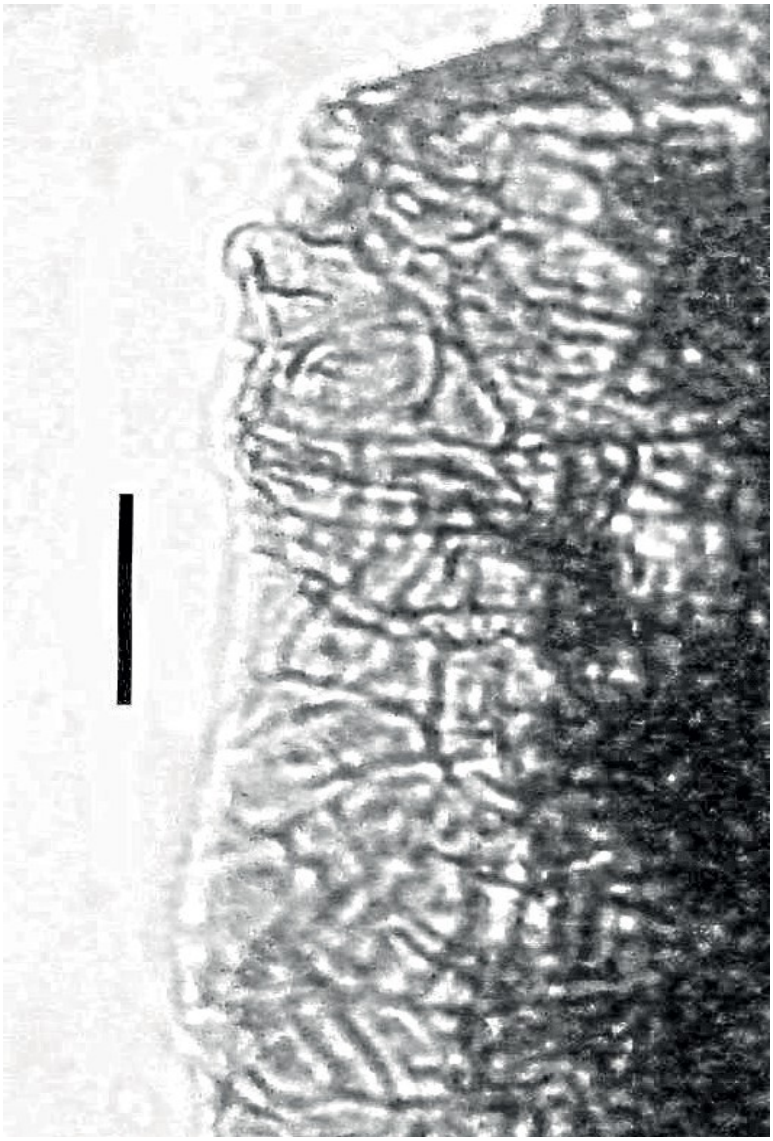


Fig. 4. A sclerotial lobe of *Palaeoclaviceps parasiticus* gen. n., sp. n., holotype, F26481BUIC (ex coll. Wunderlich) in Early- mid Cretaceous amber from Myanmar. Note anastomosed arrangement of mycelium. Bar = 0.9 mm.

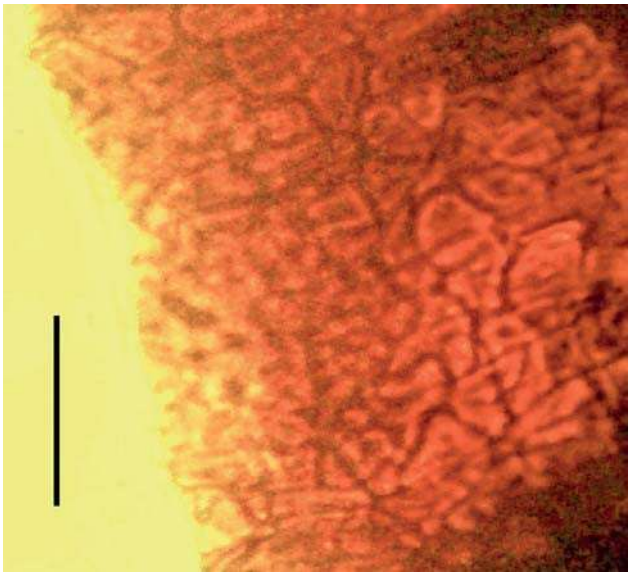


Fig. 5. Detail of arrangement of anastomosed hyphae in a second lobe of the sclerotium of *Palaeoclaviceps parasiticus* gen. n., sp. n., holotype, F26481BUIC (ex coll. WUNDERLICH); in Early–mid Cretaceous amber from Myanmar. Bar = 0.133 mm.

sweet droplets attract insects, especially flies, which can carry the conidia to healthy florets, facilitating new infections. While no extant *Claviceps* sclerotia are known to have flattened lobes as occurs in *Palaeoclaviceps parasiticus* gen. n., sp. n., some sclerotia of *C. purpurea* infecting rye do occasionally have a rugose surface with some short thick lobes (Fig. 7).

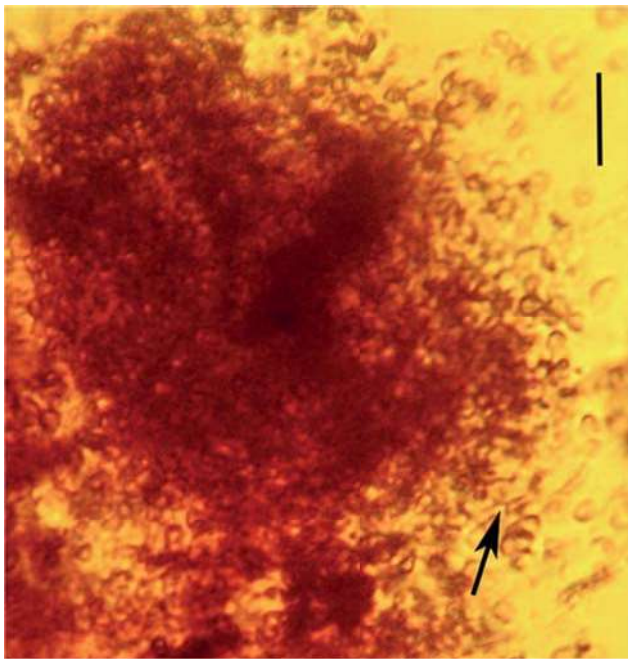


Fig. 6. Group of *Sphacelia* conidia and conidiophores (arrow) adjacent to the developing sclerotium of *Palaeoclaviceps par- asiticus* gen. n., sp. n., holotype, F26481BUIC (ex coll. WUNDERLICH) in Early–mid Cretaceous amber from Myanmar. Bar= 0.13 mm.

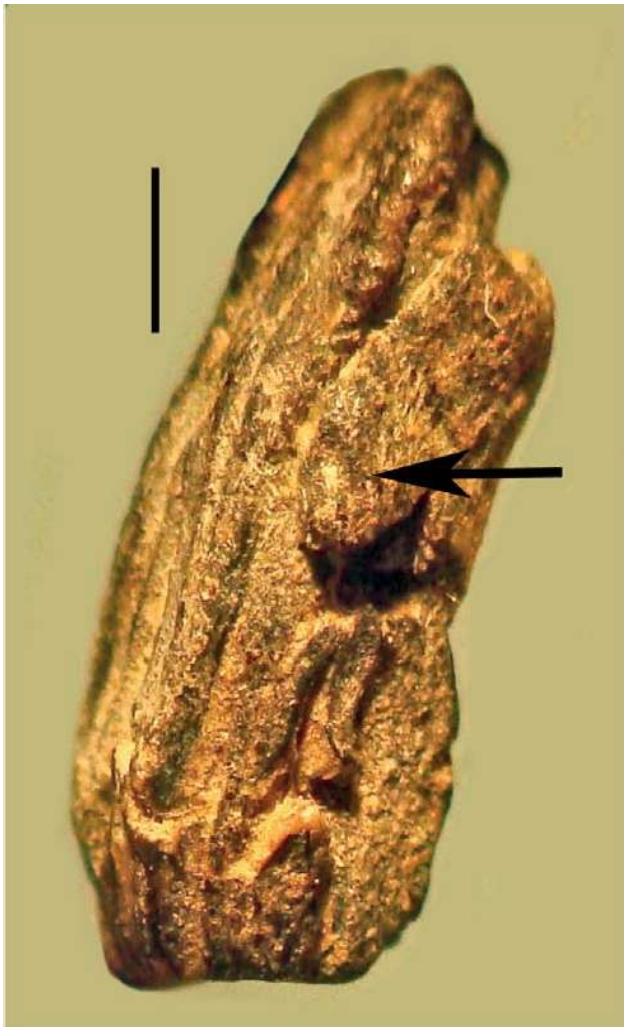


Fig. 7. An extant sclerotium of *Claviceps purpurea* showing irregular surface with a folded lobe (arrow). Bar = 1.5 mm.

Ty p e h o s t : While grasses are the most common hosts of ergot fungi today, some members of the Cyper- aceae and Juncaceae are also attacked. However, grasses are the only members of this group that lack bracts sub- tending the inflorescence branches and the only group with spikelets possessing a pair of sterile glumes subtend- ing the florets (LINDER 1986; DICKISON 2000; METCALFE 1960). Members of the Cyperaceae only have a single bract (prophyll) subtending each flower and the Juncaceae have trimerous flowers with two or more prophylls situ- ated dorsally and ventrally in the medial plane, with an arrangement of 3+3 tepals (DAHLGREN et al. 1985).

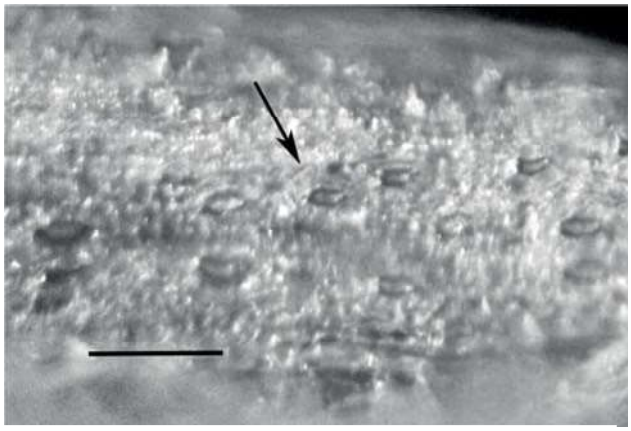


Fig. 8. View of exposed surface of lemma showing rows of sto- mata in the grass host of *Palaeoclaviceps parasiticus* gen. n., sp. n., holotype, F26481BUIC (ex coll. WUNDERLICH) in Early–mid Cretaceous amber from Myanmar. Arrow shows border sepa- rating rows of epidermal cells with and without stomata. Bar = 0.14 mm.

The infected spikelet is laterally-compressed, 9.5 mm in length, with a rachilla bearing two complete basal ster- ile glumes and a series of 5 lemmas: bracts glabrous, awn- less: lengths, first glume, 2.7 mm in length; second glume,

3.4 mm in length; first lemma, 3.3 mm in length, second lemma, 3.9 mm in length; third lemma, 3.3 mm in length; fourth lemma, 3.4 mm in length; fifth lemma (partial), 3.3 mm in length: stamens not observed; short rows of sto- mata occur on the exposed surfaces of some lemmas (Fig. 8); stomata 75–99 µm in length and 48–59 µm in width;

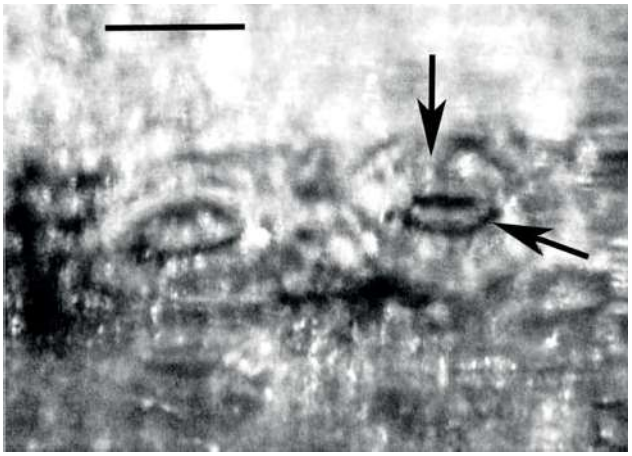


Fig. 9. Detail of two stomata in the lemma of the grass host of *Pal- aeoclaviceps parasiticus* gen. n., sp. n., holotype, F26481BUIC (ex coll. WUNDERLICH) in Early–mid Cretaceous amber from Myanmar. Top arrow shows subsidiary cell. Lower right arrow shows slightly expanded terminus of guard cell nucleus. Bar = 0.06 mm.

guard cells reniform, with thickened inner wall; guard cell nuclei prominent and elongated with slightly bulbous ends, 32–40 µm in length, guard cells flanked by low-dome- shaped subsidiary cell (paracytic) (Fig. 9). The above char- acters place the infected spikelet in the family Poaceae.

4. Discussion

The preservation of *Paleoclaviceps parasiticus* gen. n., sp. n. was excellent and the grass florets and sclerotium appeared unaltered. Such preservation of amber fossils is due to rapid dehydration and tissue fixation by chemicals in the original resin. While there is often some collapsing due to dehydration in embedded arthropods, it is rare to find distorted fungal tissues in amber. Even the fragile pileus of the Early–mid Cretaceous Myanmar amber agaric, *Pal- aeoagaracites antiquus* POINAR & BUCKLEY 2000 that was partly decomposed by a mycoparasite, showed no signs of distortion, nor was there any evidence of damage to the phialides of *Paleoophiocordyceps coccophagus* SUNG, POINAR & SPATAFORA in Myanmar amber (SUNG et al. 2008). Based on molecular evidence, SPATAFORA et al. (2005) and SUNG et al. (2008) hypothesized that the archetype of the Clavicipitaceae was an invertebrate pathogen with an age estimate of its crown node being at least 117 Mya. The present discovery provides evidence that the arche- type could just as well have been a plant pathogen such as the present fossil or another possible grass endophyte (e.g., *Balansia* and *Epichloe*) and that invertebrates were infected later through interkingdom host shifts. SUNG et al. (2008) estimated the crown node of grass symbionts (including *Claviceps* spp.) to be at least 81 Mya, suggest- ing that fungal–grass symbioses originated in the Late Cretaceous. This date is congruent with finding a *Claviceps*-like fossil that is roughly 100 million years old.

PAZOUTOVA (2002) suggested that the ancestors of *Clav- iceps* evolved on panicoid grasses in the American tropics sometime in the Upper Cretaceous. This was based on the interpretation of ancestral and advanced characters and finding *Claviceps* species with primitive undifferentiated sclerotia in that region. These primitive strains of *Clavi- ceps* then migrated from South America to North Amer- ica and then to Europe and Africa. With the discovery of a *Claviceps*-like fossil infecting a floret of an Early–mid Cretaceous Asian grass, we propose that the progenitor of *Claviceps* evolved in Asia among early grasses sometime in the mid- to Late Jurassic.

Fossil evidence has established the presence of grasses not only in the Late Cretaceous (CREPET et al. 2004; PRASAD et al. 2005) but also in the Early–mid Cretaceous (POINAR 2004, 2011). The Myanmar amber *Programinis burmitis* POINAR was described from a spikelet possess- ing characters similar to the present infected fossil spike-

let (POINAR 2004). Without additional characters, it is not possible to assign the infected spikelet to *P. burmitis* at this time. However, the present infected grass fossil adds indisputable evidence that the Poaceae was established by the Early–mid Cretaceous.

Ergot is a veritable pharmacopeia and over a thousand compounds have been extracted or derived from *Claviceps* spp. (BOVE 1955). At least some of these probably served to repel herbivores since raw ergots are reported to be bitter and cause nausea (ATANASOFF 1920). Early researchers who fed ergot-infected seeds to farm animals alsonoted that after a few feedings, the livestock refused to eat the diseased grain (BOVE 1955). If serving as a deterrent against herbivores was the primary purpose of the chemical compounds in ergot, then they were likely already present in *P. parasiticus*. It is also possible that psychotropic compounds in *Palaeoclaviceps* also served as repellants and were present at this stage in the evolution of *Clavi- ceps* (BOVE 1955).

Cretaceous herbivores that would have consumed grasses were mammals, birds and dinosaurs. One study has in fact identified grass remains in coprolites of a Cretaceous sauropod (PRASAD et al. 2005). An analysis of the feeding strata of sauropod dinosaurs (from hatchlings to adults) at the Myanmar amber site indicated that they fed in the herb and shrub zones (POINAR & POINAR 2008), where the grass host of *Palaeoclaviceps parasiticus* would have grown.

The present discovery establishes: 1) the first fossil record of a progenitor of *Claviceps*. 2), a minimum date for the establishment of plant parasitism in the Clavicipitaceae. 3), supportive evidence for the earliest known fossil Poaceae in the Early–mid Cretaceous, and 4), a minimum time for the conceivable presence of psychotropic compounds. This fossil also provides new insights into the origin and evolution of plant parasitism by the Clavicipitaceae.

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OTZI THE ICE MAN , EARLY MYCOLOGIST ?

In 1991, a group of hikers exploring the Ötztal Alps on the Austrian-Italian border came across the mummified corpse of a person half-entombed in ice. Because the find was at an elevation of 10,530 feet, the group initially suspected that the remains belonged to a lost mountaineer. Local officials brought in to examine the scene further floated the possibility that it was the body of an Italian solider lost during one of the World Wars.

Only after archaeologists had a chance to examine Otzi, so-named for the mountain range where he was discovered, did the stunning truth of his age come to light. Using radiocarbon dating, scientists determined that he had perished in the Alps an astounding 5,300 years earlier. The preservation from the ice pocket he fell into was so thorough that his brain, internal organs, penis, pubic hair and one of his eyeballs were all completely intact.

In the time since his discovery, Otzi has become a veritable celebrity of the scientific world — providing insights and blowing away assumptions about the ancient world. Below are just a few of the secrets researchers have uncovered from the Iceman, his possessions and the circumstances surrounding his unusual death.

Found on the remains of Otzi's clothing were two pieces of Birch polypore , *Piptoporus betulinus* threaded onto narrow strips of hide. The fungus, which includes both anti-inflammatory and antibacterial compounds, was highly valued for its medicinal properties. It's also highly toxic to whipworms, a parasite discovered by researchers in Otzi's colon. When consumed by Otzi, the birch fungus would have killed the parasites in his intestines and expelled their eggs from his bowels.

It's regarded by scientists as the oldest medicine kit ever discovered.

Also included amongst Iceman's possessions was a girdle bag full of a *Fomes fomentarius* the Hoof Fungus which was used to start or transport fires. *Piptoporus betulinus* also works well as a fire starter while *Fomes fomentarius* is actually the better of the two. *Fomes fomentarius* is a hard, wood conk that needs to be moistened prior to pounding which then separates the hyphae which can then be used for its flammability capabilities. Another use for this fungi is weaving it into thread and making clothing.

Ötzi - Wikipedia

https://en.wikipedia.org/wiki/Ötzi

Piptoporus betulines, The Iceman's Fungi

bioweb.uwlax.edu/bio203/2011/manske_bria

Mike Cruse

Scottish Long Weekend Foray—Friday 23rd to Monday 26th September 2022

This is part of our foray programme for 2022 agreed at our AGM in February and you will need to book your accommodation soon.

The intention is to research the opportunity of hosting a future joint foray with our German mycological friends [MAK], probably in 2025/2026.

The area selected, based on the town of Aviemore in the Cairngorms, Scottish Highlands, is because Caledonian Pinewoods, several of which are nearby, are home to some fungi not [or rarely] found in other parts of the U.K.[or Germany].

Aviemore has a large amount of holiday accommodation and it is left to attendees to book their rooms and number of nights they wish to stay. When you have booked your rooms please let me and Mike Cruse know details asap. We can agree later how to meet up for meals etc.

I am booked in at Aviemore Youth Hostel from Wednesday 21st September to Tuesday 27th September. If others wish to stay there the following is the position as of 15th May:

-one single room only available on Friday 23rd and Saturday 24th

-six twin bed rooms fully available

-no rooms en suite, but all rooms have single beds—i.e. No bunk beds.

-continental breakfast or self catering kitchen

-no evening meals

-towels included in price

-address and telephone number of the hostel is 25 Grampian Road, Aviemore, PH22 1PR

-tel 01479 810 345

Forays will be arranged on Friday 23rd, Saturday 24th, Sunday 25th, and Monday 26th. On the 23rd and 24th we will meet at the Aviemore Youth Hostel car park at 10a.m. and drive from there. Of course there may be only a few present on the Friday and Monday due to travel arrangements.

Alan Simkins

Lichen Lookout

Lichen joke from Alan:
I noted this odd appalling pun in the weekend paper-----Why did the fungus and the alga get married? Because they took a lichen to each other.

Three lichens to look out for.

Lecanora muralis

Common lichen found on flat surfaces like concrete or pavements. Called 'bubblegum lichen' Variable in colour, greens,greys, brown. Leafy lobes in a rosette. Apothecia green to brown.

Phlyctis argena

Mainly on trees, can make large white patches on tree trunks. Pale soridia erupt through the thallus making raised lines or craters. Reacts vividly with potassium hydroxide. Yellow turning red.

Thelotrema lepadinum

A creamy grey crust on sheltered trees. Its warty apothecia look like small barnacles.