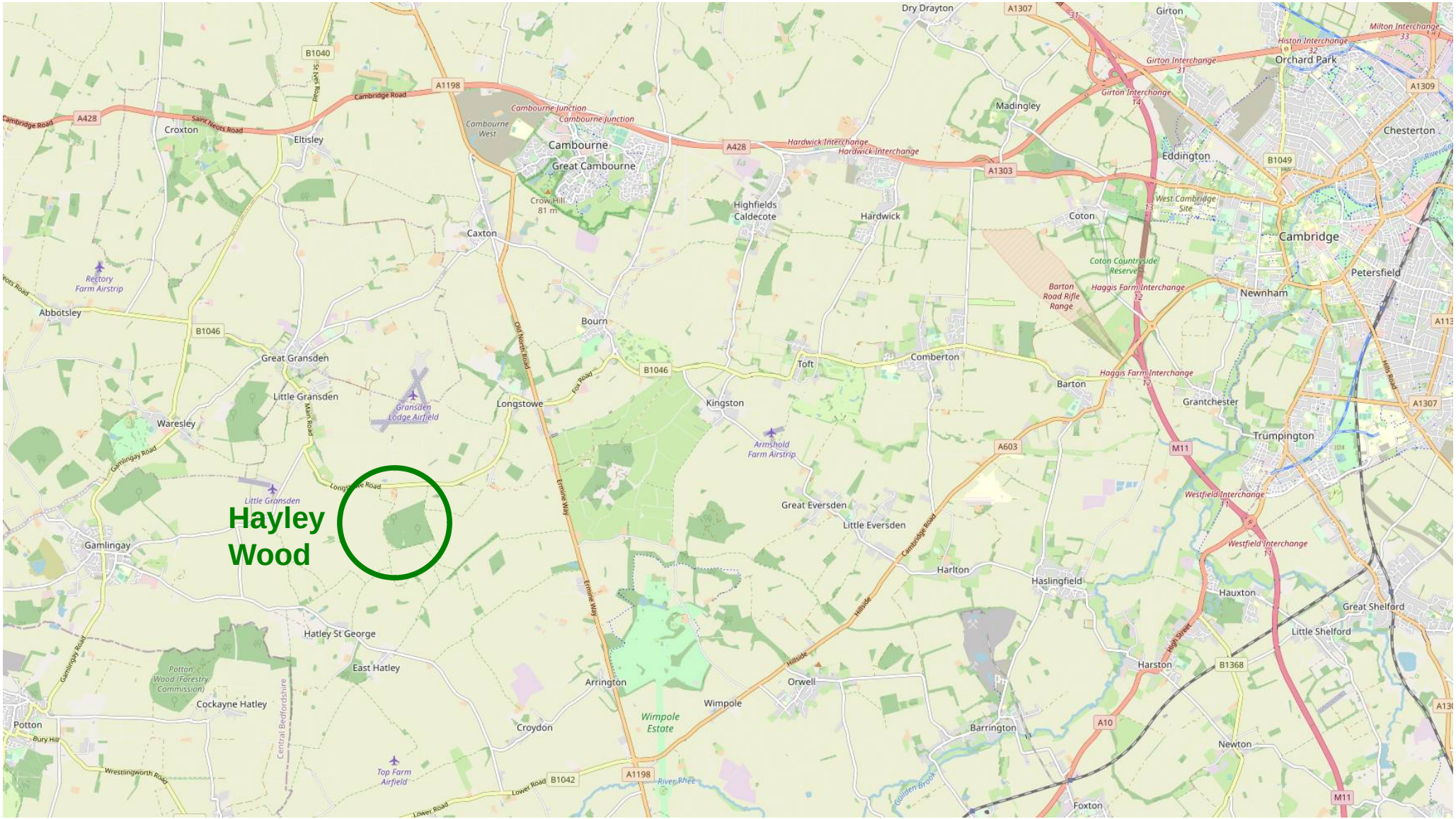
Polypody in Hayley Wood

Hayley Wood is a semi-natural ancient woodland in western Cambridgeshire and has been well studied, by Oliver Rackham and others, for decades. It is primarily an Oak woodland on boulder clay with good populations of Oxlips and Bluebells in the spring and a number of species, such as Herb Paris, typical of ancient woodlands.

It is a Site of Special Scientific Interest designated in 1955. The designation says “Hayley Wood is one of the largest Oxlip *Primula elatior* woods on the chalky Boulder Clay in Britain. Most of the wood is primary and has a recorded history of over 700 years.”

It is owned and managed by
the Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire.


Hayley
Wood
Dry Drayton
A1307
Girton
Milton Interchange
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Orchard Park
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A1309
Madingley
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Cambridge Road
A428
Croxton
Saint Neots Road
Eltisley
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A1198
Cambourne Junction
Cambourne West
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Great Cambourne
Hardwick Interchange
A1303
Eddington
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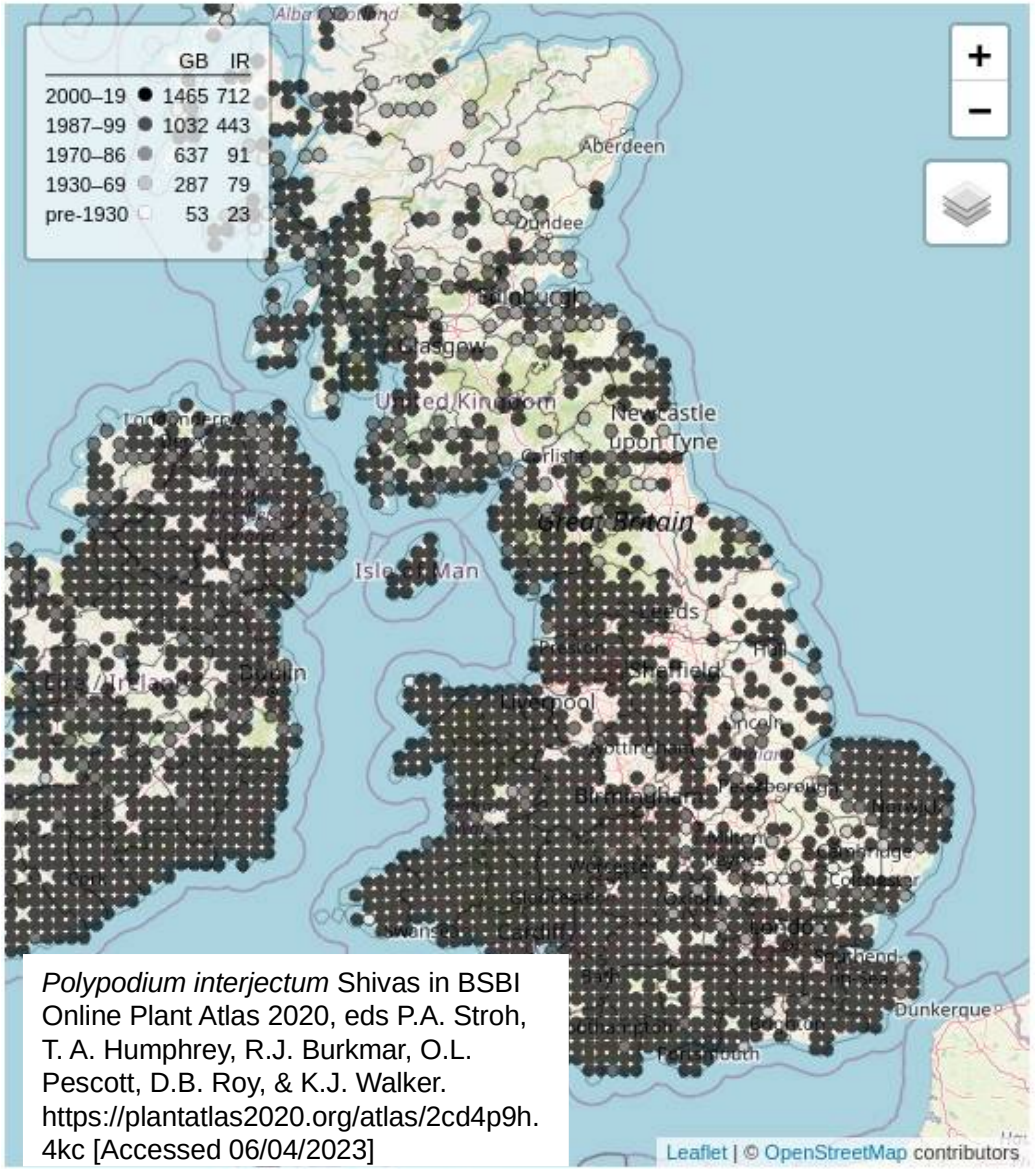
Crow Hill
81 m
Highfields
Caldecote
Hardwick
Coton
West Cambridge Site
Caxton
Cambridge
Coton Countryside Reserve
Petersfield
Rectory Farm Airstrip
Barton Road Rifle Range
Haggis Farm Interchange
Newnham
Abbotsley
B1046
Bourn
Great Gransden
Old North Road
Fox Road
Toft
Comberton
Barton
Little Gransden
Gransden Lodge Airfield
Longstowe
Kingston
Grantchester
A1307
Waresley
Main Road
Gamlingay Road
Armshold Farm Airstrip
A603
M11
Trumpington
Little Gransden
Longstowe Road
Ermine Way
Great Eversden
Little Eversden
Westfield Interchange
Gamlingay
Cambridge Road
Harlton
Haslingfield
Hauxton
Great Shelford
Little Shelford
Hatley St George
Potton Wood (Forestry Commission)
East Hatley
Hillside
High Street
Harston
B1368
Arrington
Orwell
Cockayne Hatley
Wimpole
Wimpole Estote
Potton
Bury Hill
Croydon
Barrington
A10
Newton
Central Bedfordshire
Wrestlingworth Road
Top Farm Airfield
Lower Road
B1042
A1198
River Rhee
Golden Brook
Foxton
M11



Polypodium interjectum Shivas in BSBI Online Plant Atlas 2020, eds P.A. Stroh, T. A. Humphrey, R.J. Burkmar, O.L. Pescott, D.B. Roy, & K.J. Walker. https://plantatlas2020.org/atlas/2cd4p9h.4kc [Accessed 06/04/2023]

Distribution

Polypody is quite distinctive. There are three species in the UK, plus hybrids, and they are tricky to tell apart. The BSBI Plant Atlas 2020 gives the following information:

Polypodium vulgare is an “evergreen, perennial, rhizomatous fern of well-drained, predominantly acidic substrates, including dry-stone walls, roadside banks and rock outcrops. It also occurs as an epiphyte on oaks and other deciduous trees, mainly in western Britain and Ireland, and is also found in conifer plantations. It is very tolerant of exposure, growing, for example, on montane scree. 0–760 m (Beinn na Socaich, Westerness).” The Atlas also says “It appears to be genuinely less common than *P. interjectum* in south-eastern England.”

Polypodium interjectum (see map) is an “evergreen, perennial, rhizomatous fern that prefers more basic substrates than *P. vulgare* but can be found in acidic conditions where exposed to salt-laden winds. It is found in a wide range of habitats such as mortared stone walls, hedgebanks, rock exposures, mature sand dunes and as an epiphyte on fissured bark, especially near the sea.”

The only specimen in Hayley Wood?

Photo 2009 © David Barden

First reported by David Barden in 2009.

"*Polypodium* sp. (probably *interjectum*): one clump of 3 small and 6 tiny fronds (all vegetative), 4ft up on strongly angled oak trunk 30m NE along the path that runs NE from Pond Ride back towards the old railway, on the SE side of the path. The clump was growing with moss, and looked quite healthy; aspect N. TL289.529; 17th October 2009."

David added "*I met Oliver Rackham while in the wood, and he did not know of the plant, so it would seem to be the first record for the wood*."

The number of fronds varies from year to year but the plant has survived despite now being much more exposed as the trees between it and Pond Ride (NW) have been felled.

On 4th December 2022 Richard Dowsett counted 22 fronds (right).

As far as we can ascertain there have been no records of Polypody at any other locations in Hayley Wood, despite the Wood being well-frequented by many excellent botanists.

Photo 2022 © Richard Dowsett

But late in 2022

Part of a very large Oak on Hayley Lane, on the east of Hayley Wood fell at the end of November or early December. It blocked Hayley Lane so was soon cut up and lengths of timber moved to clear the obstruction. When the Voluntary Warden, Richard Dowsett, inspected the logs THIS is what he found!

Polypody! Lots of it, looking very healthy and on several logs.

We visited on several occasions; we took lots more photos and we got the Polypody identified by Chris Preston who examined the sporangia with a microscope. He concluded both the specimens he took were *Polypodium interjectum.* This is also what Charles Turner and Martin Davies thought from morphological characteristics.

We also spotted two clumps of Polypody high up in the canopy of the other half of the oak that had fallen. We did look up at the other oaks along Hayley Lane but have not yet spotted more Polypody, though it seems unlikely that the only tree with Polypody was the one that fell.

So we went in search of Polypody elsewhere in Hayley Wood...

Polypody on fallen logs
alongside Old Hayley Lane
9th December 2022
Photo © Monica Frisch

Photo © Richard Dowsett

Underlooked !

Having spotted Polypody high up in the canopy of the half of the oak on Hayley Lane that had not fallen, we realised we had to look UP into the canopy and see if we could spot Polypody among the branches, epicormic growth, ivy and honeysuckle. Binoculars were helpful.

Monica Frisch and Richard Dowsett did find more Polypody, in the old oaks in the north-west quarter of the wood, west of the Extraction Ride. They actually found quite a lot: on 28th January 2023 they spotted colonies on five large oaks. All had diameters at Monica head height greater than 200 cm.

Further searches located another seven trees with Polypody. These were all in the North Quarter of the Wood, west of the Extraction Ride. Two were right by the Extraction Ride – where lots of people will have walked, apparently unaware of the ferns underlooked above their heads, even though the colonies were large and, once one knows where to look, obvious.

Right: Polypody fronds up in one of the big oaks in North Quarter West, March 2023.

Polypody on branch above Extraction Ride

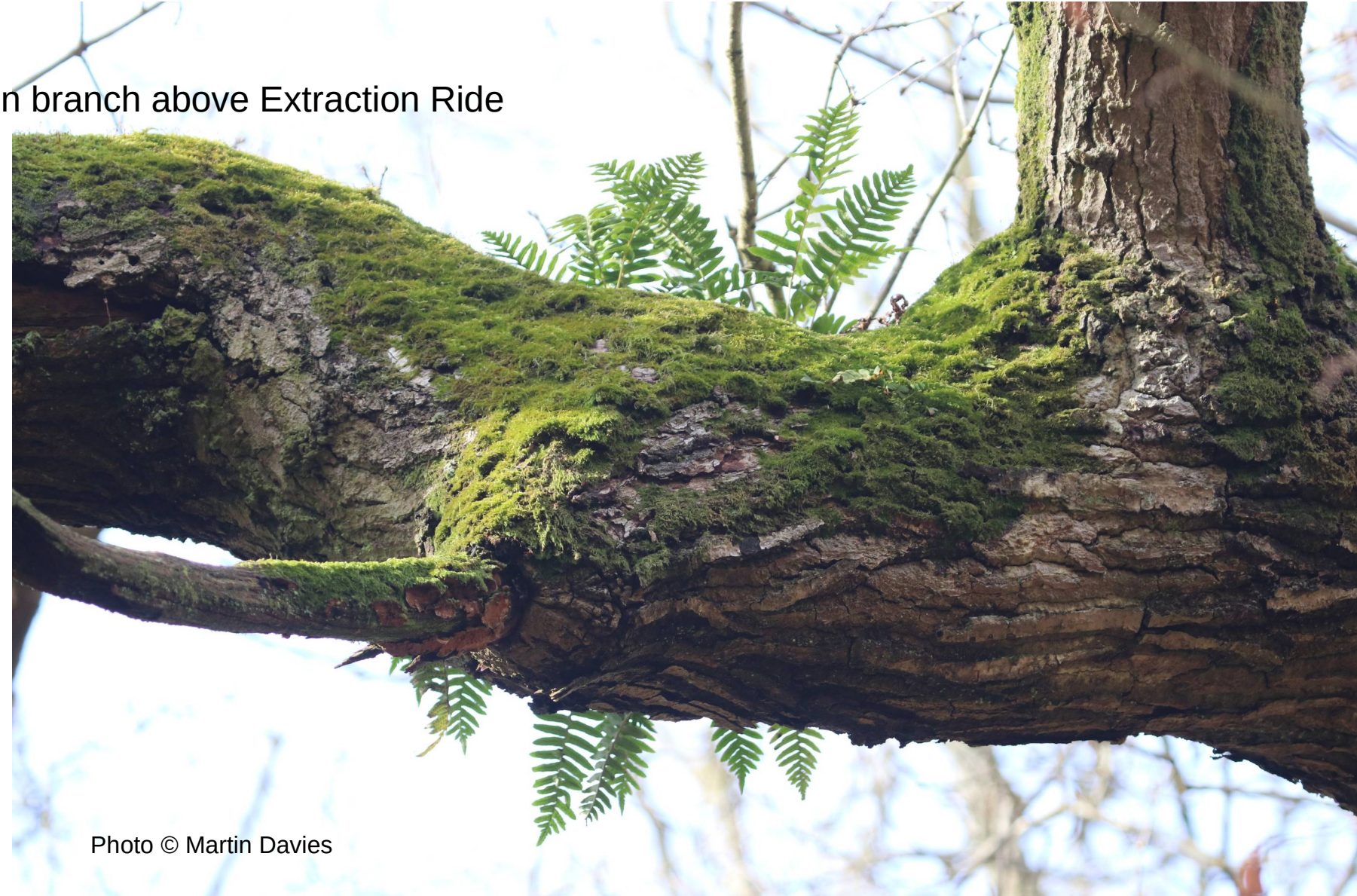


Photo © Martin Davies

While in almost all cases the Polypody was growing high in the canopy of large oaks, there are three exceptions:

The Oak where Polypody was first noted in 2009 by David Barden, which is a leaning trunk. One of the new colonies was on a dead tree which had fallen and was lying at an angle. In both cases the circumference was smaller than the other Oaks with Polypody.

The third location was high in the canopy but is now at ground level – the logs from the fallen oak – where it is thriving.

5th November 2023 Photo © Monica Frisch

Photo © Martin Davies

Identifying Polypodies

The three species in the UK are quite tricky to tell apart, requiring microscopic examination of the sori (clusters of sporangia) for certain identification.

Chris Preston looked at two specimens of Polypody he collected. Both have well-formed spores and no paraphyses, ruling out *P. cambricum* and hybrids.

The sporangia on the fallen frond from the 'original' plant have 7-9 indurated cells (mean of ten counts 8.3). The indurated cells are more difficult to distinguish on the less mature sporangia of the Hayley Lane plant at TL29385331, but again Chris made them 7-9, with a mean of ten counts 8.0. Both these plants are therefore clearly *P. interjectum*. This is also what Charles Turner and Martin Davies thought from morphological characteristics and Alan Leslie is also happy with this identification.

But we have no way of knowing whether the species up in the canopy are the same.

Close-up of Polypody fronds and of sporangia

Both photos
© Martin Davies

Microscope photograph of a piece of Polypody prepared and taken by Chris Preston.

The indurated cells are thickened cells of the sporangium, which contains the spores.

Paraphyses are small hairs, often branched, found among sporangia in some species, but absent in *Polypodium interjectum*.

Polypodium interjectum 'Original Polypody' on trunk of pollarded oak, amongst mass of *Isothecium myosuroides*, alongside recently coppiced plot, North Quarter, Hayley Wood, TL28975292.

Spores well-formed (one arrowed). Paraphyses absent. Indurated cells 7–9, mean of ten 8.3.

Questions

How long has Polypody been present in the canopy?
If for several years, why has no-one spotted it?

Is it because:

- few botanists look up, mostly scanning the ground?
- it is hard to see – even if one does look up – except in winter when there are no leaves on the trees and can be seen in silhouette against the sky?
- bryologists who do go out in winter mostly scan the ground, not the canopy?

Why is it only in some parts of the Wood?

Why is it only on some oaks?

Is it only on really big oaks?

Do only certain trees provide the appropriate environmental conditions for it to thrive?

Photo shows frond shrivelled due to spring drought in April 2022.

Environmental requirements?

We think it is something to do with moisture – it seems to always be growing in moss, which presumably provides the dampness ferns need to reproduce. And the moss also needs damp conditions, hence more on trees not exposed to sun or drying winds.

David Barden added “Here in the much wetter climate of Wales, Polypody is moderately common as an epiphyte, but I would probably say only locally abundant. In more open places, we see it most reliably high up on the horizontal boughs of old trees. I suspect that it prefers such spots because it's exposed to the rainfall, and being horizontal this rain doesn't run off but can get absorbed by the moss. But in damp or shady places by streams, it can grow anywhere, and I've seen it growing low down on dense scrub of Hawthorn and Elder (which supports a lot of bryophytes anyway), although these plants are often small and vegetative. It sometimes grows on ancient banks, but it's my impression that this habitat is less common here than in SW England, for some reason. Our plants are equally likely to be *vulgare* or *interjectum*, and strangely we rarely see it growing on walls. Very rarely we have the hybrid, but I suspect this is overlooked or misidentified; I confess that most of the time I record *vulgare* or *interjectum* on the basis of sorus shape and frond shape, and only bother with microscopic determination when the plants look 'odd'.”

Is light also a factor? Is that why it is high up in the canopy?

Clearly there has to be a balance between the need for moisture and the drying atmosphere of exposure to light.