

St Michael's Church Lichen Trail – David Hill

Introductory notes on lichens

In Britain, there are usually **about 50-100 species of lichen in a churchyard**. The St Michael's Church lichen trail aims to introduce some of the lovely decorative lichens growing in this churchyard. These lichens are typical of Somerset churchyards, except two specially rare species. Lichens can be seen on tree trunks, buildings and stone monuments as different coloured patches. They are fungi which live on the surface. Unlike other fungi, they obtain their nutrition from microscopic green cells of algae within their structure. These algal cells provide the fungus a kind of sugar which they make with sunlight by photosynthesis. The fungus in return constructs a niche which is ideal for the algal cells to thrive. There are three broad shape forms; most of the lichens on stone hug the surface (**crust**); some lichens look like leaves (**foliose**); and others have many branches (**shrubby**).

There are **about 1800 species of lichen in Britain** and their names take that of the fungus. Fungi of lichens are extremely diverse having evolved from many unrelated non-lichen fungi. Most lichen fungi are **cup fungi** (Ascomycetes) but there are a few **toadstools** (Basidiomycetes). There are far fewer species of algae in lichens perhaps only a few hundred. The algae belong to some very different groups. Most lichens contain a green alga but from groups of green algae that are not closely related. About 10% of lichens species contain photosynthetic bacteria (cyanobacteria = blue-green algae). The type of alga is associated with the ecology and geographical distribution of the lichen. The relationship between the fungus and the alga is **a type of symbiosis** (= the living together of unrelated organisms) for mutual benefit. The alga provides food for the fungus partner and in return the fungus provides the alga partner with protection and somewhere to live.

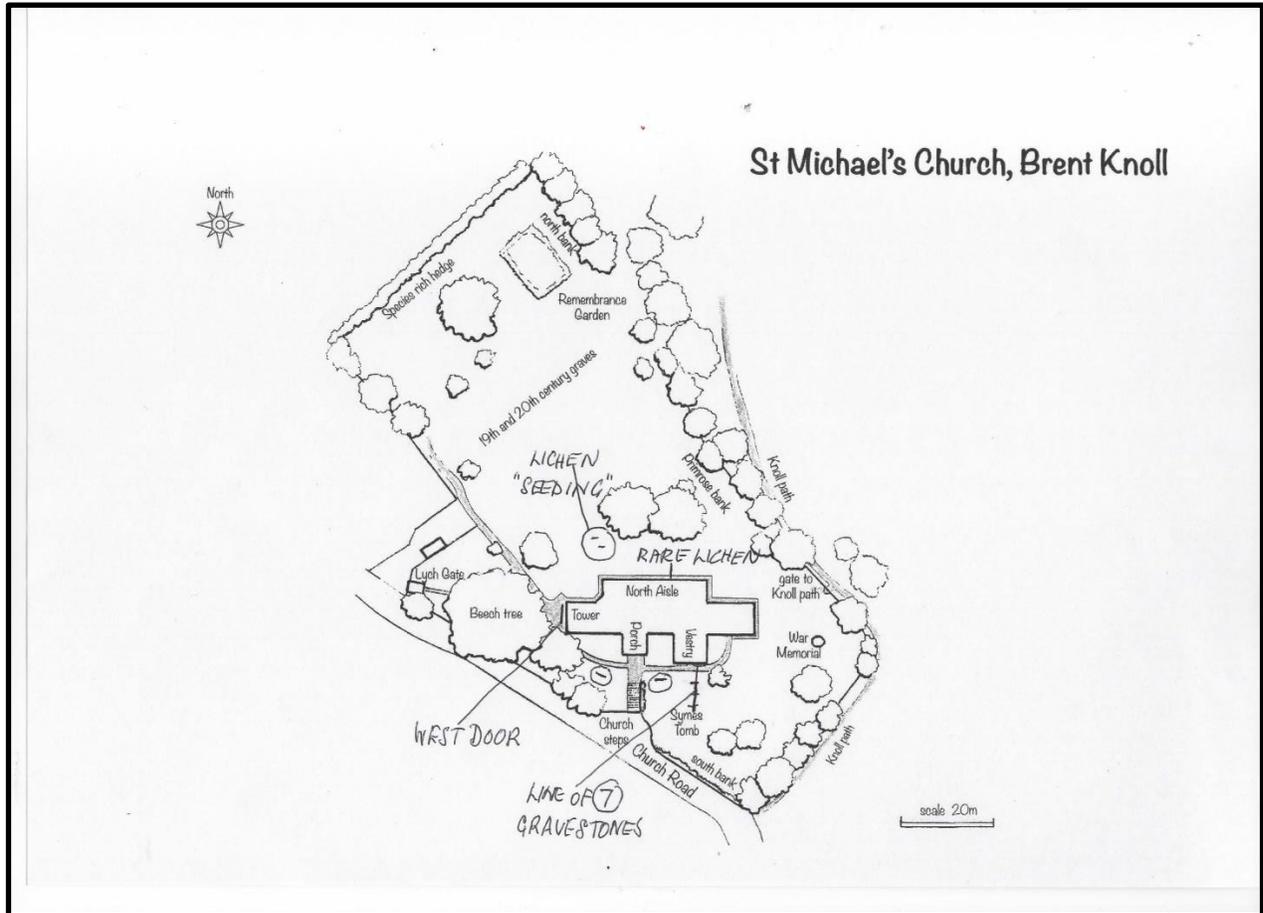
For the non-botanist, lichens can be confused with mosses and liverworts. Mosses and most liverworts have very small but individual leaves on a stem and are mostly a grass-green colour. Thallose liverworts do not have leaves but have spreading lobes which are green on top and underneath. Very few lichens have a grass-green colour and those that do have a different colour (usually white) underneath.

Lichens can survive complete desiccation, which enables them to thrive on exposed surfaces. They obtain water from rain and by absorbing water from humid air. Lichens which contain cyanobacteria need liquid water from rain but lichens with green algae can absorb some moisture from the air. One particular alga (Trentepohlia) which occurs in several lichens is very efficient at doing this, as we shall see in this churchyard.

Lichens reproduce in two ways: a) the **fungus produces microscopic spores** which float away to a new location where they germinate and, if a suitable alga is present, form a new individual and b) by forming small particles known as **soredia which contain a mixture of fungus and alga** which, though larger than spores, can distribute the lichen widely.

Lichens are known for their **sensitivity to pollution**. In the second half of the 20th century, lichens were decimated in urban areas by sulphur dioxide pollution. This pollution has since been reduced to low levels and lichens have returned to our cities. Now we have discovered that lichens are being seriously affected by **nitrogen pollution from traffic and agriculture**. Nitrogen pollution is of international concern since we are putting so much nitrogen into the soil for crops it is causing a massive imbalance to the earth's environment.

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The lichen trail starts at the west door of the church and takes you round the church in a clockwise direction. To get best value from the trail we suggest that you have a magnifier handy, and read the introductory notes before you start. This will give you a better idea of what to expect. We have provided a series of pictures to illustrate the trail, but, if you wish to take pictures yourself, most reasonable quality digital cameras will enhance your enjoyment of the trail. A smartphone with a macro setting would be ideal.

As you walk towards the N aisle from the W door you are asked to walk along a gully top the N of the building. Please take care when you step into the gully. We ask you to retrace your steps when you have looked carefully at the walls in close up.

There is a gap in the trail at the east end of the church and it resumes from the front of the church at the S vestry door.

When you have completed the trail you should know quite a bit about lichens and you could wander further around the churchyard to test your new found knowledge.

We suggest that you walk this trail AFTER reading the introductory notes

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1. Start at the West door of the church, where you can see two interesting lichens.....
 - a. Pale grey and powdery circular patches on the outside walls of the church either side and above the West door. This **crust** lichen is *Dirina massiliensis forma sorediata*. It is characteristic of church walls in Britain and rarely occurs in other places.
 - b. Some of the grey patches have a darker grey surface. This crust lichen is *Paralecanographa grumulosa*. It is a rare species and found only on very old buildings such as churches in the south west of Britain.

2. Now walk down to the NW corner of the North aisle. **Step down carefully onto the gully next to the wall of the church** and walk along the gully to the **4th buttress...**
 - c. Looking up to the left of this buttress, you will see tufts of another grey lichen, this time a **shrubby** lichen, called *Roccella fuciformis*. This is an **orchil** lichen (orchil = a purplish dye extracted from a lichen). It is now very rare and is normally only found on the coast in SW Britain in sheltered spots on rock outcrops. Here it is unusual in occurring so far inland. Notice how sheltered this North wall is from weather coming in from all points of the compass. It too contains the alga *Trentepohlia*.
 - d. Lower down nearer the ground you will see orange patches which are finely furry. This is a species of the **independent alga** *Trentepohlia* similar to the one in the lichens you have just seen. If you scratch the grey circular crust lichen *Dirina massiliensis forma sorediata* – there is some on this wall too – you will see the yellow colour of the *Trentepohlia* alga inside it. The yellow or orange colour is due to pigments similar to that in carrots.

3. Walk back along the gully and go East around the church to the South side. As you walk just look at the general level of encrusting by lichens and **compare the N side with the S side of the church**. The cooler moister atmosphere on the N side supports more lichens. On the S side go past the chancel (the end of the church) and stand at the seat by the S vestry door. In front of you looking away from the church is a row of 7 gravestones (or headstones). Taking these in turn from the church the first two headstones are made of **limestone**
 - e. **Note the yellow/orange circular patches**. These are the lichen *Caloplaca*. There are two species of this family of lichens that look very similar (*flavescens* and *aurantia*). Looking closely you may see flat discs on the surface which are the fruiting bodies releasing spores. These lichen only grow on limestone (and other chalky surfaces). They are easy to spot and you will see them on other gravestones, and the church.
 - f. **Larger white circular patches** are the lichen *Aspicilia calcarea*. This has tiny black star-like dots in the surface which are the fruiting bodies releasing spores.

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4. The next two headstones are made of **sandstone**. The lichens on these stones are different from the previous ones, mainly because it is acidic rather than alkaline.
 - g. On the top of the gravestone is a **greenish-yellow lichen which is loose on the surface of the stone forming leafy-like lobes**. This is *Flavoparmelia caperata* (Common Green Shield Lichen). Note the dusty patches of soredia.
 - h. **The blackish-brown leafy lichen** next to the Green Shield lichen is *Melanelixia fuliginosa* (Shiny Brown Shield Lichen). Leafy lichens are called **foliose** lichens to distinguish them from the **crust and shrubby** lichens you have seen so far. This lichen has little tiny finger-like outgrowths (isidia) on its surface which break off and spread the lichen through soredia (see introductory notes).
 - i. **A yellow crust lichen** on the side of the gravestone which is scattered over the surface and NOT making circular patches is *Candelariella vitellina* (Goldspeck or Yolk Lichen). Although this looks yellow like *Caloplaca flavescens* on the limestone it is quite different and the colour is due to a completely different pigment. Apart from the colour these species are easily seen as different. Note the fruiting bodies which release spores.
5. Ignore stones 5 and 6 and look at the last stone in the row, a granite cross. Like sandstone granite is acidic. You can see the Shiny Brown Shield Lichen that you have just seen on the sandstone on this stone as well.

The lesson from looking at this row of gravestones is that **lichens can be used to work out what kind of stone a particular gravestone is made from.**

6. Now walk back onto the path and you will see a long flat gravestone with a triangular top to your left before the steps:
 - j. This has a pale **crust** lichen covering its south side and part of its north side. This is *Ochrolechia parella* (Crabs Eye Lichen) which tends to cover large areas when it is present. You can see the little discs or saucers on the surface which are the fruiting bodies releasing spores into the air. Notice also the Shiny Brown Shield Lichen (h) which indicates the type of stone. What type of stone is it?
 - k. Continue on the path and walk past the porch towards the large beech tree. On your left beyond the steps is a flat horizontal stone that has a greenish-yellow lichen on it. Do you recognise this (g)?
7. Finally, if you have time, **you can look at an example of how lichens reproduce**. Walk out on the path from the west door towards the main part of the churchyard. After 20 metres you will see two gravestones on your right just beyond a yew tree. Looking at the face of these stones you will notice that they have streaks of lichen patches running vertically down the centre of them. These streaks are of *Caloplaca* species which you saw earlier on the first of the row of headstones on the South side of the church. Birds perch on the top of the gravestone and their poo contains spores of the lichens they have eaten. These streaks are caused by spores being washed down by rain and germinating in a nutrient rich environment as they are carried down the gravestone.

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Illustrations (Latin names) – local photos by Ged Keele – listed in order that they occur on the trail



Dirina massiliensis forma *soreciata*



Paralecanographa grumulosa



Roccella fuciformis

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Caloplaca flavescens



Caloplaca aurantia



Aspicilia calcarean



Flavoparmelia caperata

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Melanelixia fuliginosa



Candelariella vitellina



Ochrolechia parella



Headstone with bird spread lichen growth