

## **Lichens Invade the Midlands**

### **Summary of Talk**

It is an exciting time to study lichens due to the recent changes in atmospheric pollution. From the Industrial Revolution until the 1980s, there were high levels of acidic sulphur dioxide pollution. In recent decades the pollution regime has changed and now the fertilising effect of compounds of nitrogen are dominant. Most lichen species are very sensitive to sulphur dioxide and the Midland areas of England were formerly considered to be lichen deserts. Now we are witnessing a spectacular invasion of the lowland England, some species spreading back from their refuge on the Atlantic coasts, other lichens are recently described species which have become common across Western Europe within the last two decades. Since the 2009 British lichen Flora was published, at least 34 new species have been added to the British list of species which gives an indication of how much work is still ongoing with lichen taxonomy. Six of these species were added by Mark in the time since he started studying lichens in 2007.

Mark explained what a lichen is: basically it is made up of a fungus and an alga. A scale model was built (x 1000) using bubble wrap, pipe cleaners and peas. The pipe cleaners simulated the non-specialised hyphae (like the mould on old food) while the bubble wrap indicated the way that these hyphae form a specialised cellular tissue which gives strength to the upper and lower cortex of leafy lichens. The peas were used to indicate the algal cells which are situated just under the upper cortex. The lichen fungus farms the algae which provide it with sugars from photosynthesis. If the alga receives any benefit, perhaps it is the protection within the fungal structure even though many of the algae can be free-living. Many lichen fungi produce spores that are released into the atmosphere. The fungus cannot live on its own and the spore has to meet up with an appropriate alga within a short period of time in order to survive.

Many crustose lichens growing on rock are impossible to identify in the field and techniques are required for removal of the lichen without damaging the surface on which they grow. Mark has developed a technique using a razor blade to pare off small patches of the crust which is then glued onto a piece of cardboard. Once collected, various internal structures, such as spores, require microscopic examination. Various chemicals are traditionally used to produce characteristic reactions and stains are used to define the fungal structure. A useful stain has been recently developed using Parker Blue-Black ink and acetic acid (the ink-vinegar technique). It is not unusual for the identification of a difficult specimen to take an hour or more.

Mark went through examples of lichens that he has discovered: the location and the background to identification. For example, Mark was asked to survey the Borghese balustrade at Cliveden in Buckinghamshire and found a new British species (*Caloplaca calcitrata*). The stone was imported from the Mediterranean over a hundred years ago and this appears to be one of the few examples of an introduced lichen species. Churchyards are very important habitats for lichens. Earlier in the year, at Great Wymondley in Hertfordshire, Mark and Andrew Harris (Hertfordshire recorder) rediscovered *Lecania coeruleorubella*, which was presumed extinct – the last British sighting was in the 19<sup>th</sup> Century. The study of lichens had hardly started by the time the Industrial Revolution was underway and so there is the problem of having few reliable historic records. Confronted with this problem, Mark has looked at wattle and daub panels from old houses and found that the lichens that were originally growing on them are still identifiable. From analysing the lichens on such panels, Mark has identified nine species new to Bedfordshire some of which were thought to be oceanic but it appears they were pushed out by the pollution.

Although lichens are not the easiest group to identify a good start can be made by obtaining the Field Studies Council chart "Lichens on Twigs" (available for £3 online). With little more than a hand lens and a few months dedication any budding lichenologist can be ready to help record the remarkable changes.