

Working document - *Opegrapha ochrocheila*

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Opegrapha ochrocheila

When starting to study lichens I used Dobson (2005) as my guide. The distribution maps showed a rather sparse scatter of records for *O. ochrocheila* in Eastern England whereas *O. atra*, *O. varia* and *O. vulgata* had a more dense spread of records. Therefore it came as a slight surprise when *O. ochrocheila* appeared to be particularly common and I started to doubt my identifications. When the lirellae are strongly orange-pruinose and bleed K+ magenta this species is presumably safely recorded in the field but many specimens are very sparsely pruinose and it is often difficult to find pycnidia. When attempting microscopic examination, and especially as an 'improver' with only a modest microscope, there is scope for confusion with *O. herbarum* and perhaps also with *O. atra*.

If I was asked to find *O. ochrocheila* in a particular area I would head to an old woodland first and examine any old *Fraxinus* bark (high-cut coppice stools or gnarled tree bases) as a particularly likely place to find it. *O. ochrocheila* also occurs on much younger bark such as coppice regrowth. It is not by any means restricted to ash trees but many of my specimens are from *Fraxinus* bark. Nor is *O. ochrocheila* exclusively corticolous as I have very occasionally found it on saxicolous substrata including an old brick cemetery wall in Hertfordshire and near the base of a sandstone headstone in Bedfordshire.

Pentecost & James (2009) in the key for *Opegrapha* in the 'New Flora' state that the exciple is "K+ diffusing magenta" and compare it with that of *O. atra* "K+ olive-green". In the species description the "K+ magenta-red" of the exciple is (I think correctly) attributed to the pruina. For all other species of *Opegrapha* where a K reaction is given for the exciple this indicates the pigment of the hyphae/hyphal walls. The actual pigmentation of the exciple in *O. ochrocheila* is not mentioned. For *O. herbarum* the exciple is stated to be "red-brown, K-". In reality the pigmentation of the exciple is difficult to see except in very thin sections unless one assumes that the more diffuse hyphal pigment towards the edges of the exciple are representative of the dense interior. Gentle slip-squashing can reduce the section to roughly one hyphal thickness while retaining the positions of the various parts.

When mounted in water *O. ochrocheila* has fuscous brown hyphal walls with a purplish hue (I still need to work out exactly where the purple pigment is situated but it is not an optical effect). To my surprise this purple pigment dulls distinctly in K to a dull olive-brown (brightens to reddish-brown in N). There is however often a purplish patch near the upper edge of the exciple which intensifies purple in K (due to the presence of magenta granules rather than the pigment of the excipular hyphae). If one considers the true pigmentation of their exciples, *O. herbarum* is very similar to *O. ochrocheila*: in water there is a purplish pigment detectable among the fuscous brown hyphal walls and once again this purplish pigment is lost in K and the exciple becomes dull olive (N+ reddish-purplish-brown).

Epithecium

At a glance down the microscope the epithecium provides the most conspicuous difference between *O. ochrocheila* and *O. herbarum*: dull fudge brown with more localised brighter orange-brown in the former; dark fuscous brown in the latter. The epithecium is less complicated in *O. herbarum* where the epithelial gel is colourless and one type of epithelial granule is present (fuscous brown, K-, N+/- faint purplish tinge). The epithelial gel of *O. ochrocheila* is mostly pale fudge-brown but with a brighter orange-brown in the vicinity of

granules. There are at least two types of epithelial granule. Further work is needed but the following observations will give an indication (these observations require checking with more specimens).

In water the granules are colourless and range from fine to relatively coarse, the gel is yellow-orange in the vicinity of the granules. On adding K numerous fine magenta granules are seen but at least a similar quantity of K-colourless granules are present. On adding N no magenta granules are seen, a proportion of granules dissolve and the gel around remaining granules becomes bright ochre-yellow.

If N is added to a water mount, a considerable bulk of the granules dissolve and the gel surrounding the remaining (colourless) granules becomes bright ochre-yellow. On adding K a small proportion of small magenta granules are present.

Note that small hyaline granules can appear coloured due to optical effects and often appear pale blue (but can appear pink). It can be useful to concentrate on a single granule and rack up and down to see if this shows any change in hue due to refractive effects).

Hypothecium

The hypothecium of *O. herbarum* is more distinctly delimited, perhaps mainly due to the presence of the diffuse layer of granules towards its upper edge (which brighten slightly in K and N). Otherwise the pigment is a diffuse version of that in the exciple. In *O. ochrocheila* no granules are present and the only pigment is similar to that in the exciple and becomes less intense upwards. In both species the pigment (rather than the granules in *O. herbarum*) give the same K+ dull olive colour of the exciple.

Perispore

Improvers often complain about the difficulty of observing the presence or absence of a perispore and it *can* be tricky. Without staining it is very difficult to judge between a thin perispore and the optical halo effect adjacent to the spore wall. A wide perispore ought to be readily seen but is not always distinctly different from the refractivity of the mounting medium. I find the ink-vinegar staining method useful. One can introduce Parker Blue-Black ink to either a water or K mounted section and in either case clear through with dilute acetic acid. This is usually effective in demarcating the spore wall and the outer edge of the perispore. Using this method I have confirmed my suspicion that *O. ochrocheila* possesses a thin perispore. The text in the Flora does not state whether a perispore is present or not but the drawing on p639 suggests it is absent and it is said to be absent by Dobson (2011).

Size and septation of ascospores

The spores of both *O. ochrocheila* and *O. herbarum* are consistently 3-septate and those of *O. herbarum* are generally larger, wider and with a chubbier appearance. However the difference in width is not as marked as the published dimensions imply with those of *O. ochrocheila* being often near the upper end of its range and those of *O. herbarum* towards the lower end of its.

In both species the second cell is often somewhat enlarged, more often and more exaggeratedly so in *O. herbarum* but without such a clear-cut difference that inexperienced lichenologists can reliably distinguish them. I plan to measure a statistically significant number of spores from several specimens of each so that I can be less subjective about the spore measurements.

Email received from John Skinner:

Dear Mark,

I will read your notes carefully as they are very interesting. My most interesting observation about *O. ochrocheila* concerns the colour reaction with K. The uppermost part of the hymenium (epithecium?) and the basal part of the hymenium are both golden brown in water, the upper part brighter golden, the lower bit darker, but both essentially very similar. If you then flood the section with KOH and leave it for at least 5 minutes, sometimes longer, both parts turn bright olive green. If you have not seen this effect then maybe it's to do with the concentration of KOH I am using which I do not know but suspect it is stronger than 10%. I have

obtained this reaction with all the *O. ochrocheila* that I have looked at. [I have not managed to replicate this reaction, MP]

I have not looked at *O. herbarum* with this reaction in mind or at least I did not make a note of what I saw. The Flora mentions a K+ olive green reaction of the exciple or epithecium (*O. atra*) in several species. It seems to be considered a significant reaction. I intend to look at this when I dig out the specimens. The Flora also says that herbarum is 'distinguished by the red-brown exciple and epithecium' but also give the epithecium of *ochrocheila* as 'reddish brown'.

Again looking at the Flora, I had the idea that the Iodine reaction of the hymenium might be a useful character but after reading Alan Orange's account of *amylomyces* in 'Microchemical Methods I gave up. The iodine concentration is so critical to the reaction (red or blue).

The conidia in *O. ochrocheila* are very useful and seem to be unique in their long length. Brian Coppins said in an email that *O. deminuta*, which is the only other *Opegrapha* with similar conidia, might actually be *ochrocheila*.

The buff pruina when present is a great help. If I find it I count it as a field record. Without pruina I think you have to check. Years ago I saw it with scarlet pruina in a sheltered Scottish valley.

Ecologically, I see *O. ochrocheila* as a relict species now regaining its 'normal' status in woodlands. Pre-millennium, in Essex, there are a couple of Peter Bennett records of it growing on tree roots in woodland ditches. Now I see it on tree trunks, usually with a continuous or spreading growth at the base and scattered smaller thalli as you go up the trunk, in other words a clear demonstration of an upward movement of spores as opposed to the downward rainwash patterns you see with sorediate species. The thalli at the base of the trees are often browner, while the young thalli further up are fresh and white. I think this lichen survived the worst of pollution in crevices in the shaded bases of woodland trees. If sterile, you would never find or identify it. From those refugia it has spread and continues to do so. [John's ecological notes ring very true, MP]

I also find *ochrocheila* as spot-like thalli on elder with *O. viridipruinosa*.

I have only found herbarum three times. Once on lignum in Cornwall years ago (superb material) and twice recently in Essex, both on smooth vertical bark of ash in woodland, young thalli. Older books give it as growing on dead herbaceous plants and the Flora mentions bramble stems - not a habitat I have looked at very often.