

Phaeocalicium populneum

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After conducting a survey of the RHS garden at Wisley on 18th August 2018, Fay Newbery kindly showed me the colony of *P. populneum* at Esher Common. One of the poplar trees on which it grows there has been blown down and cut up this summer but *P. populneum* is still present on the twigs of an adjacent tree (TQ125.632). Specimens taken from the fallen tree and one small twig taken from the standing tree, allowed me to investigate this species for the first time. I have put up a collection of annotated images (including micrographs) here:

<http://fungi.myspecies.info/taxonomy/term/8654/media>

My recent investigation has revealed what I consider to be some inconsistencies, errors and omissions in LGBI2 (Smith *et al.* 2009).

The generic description for *Phaeocalicium* given in LGBI2 states that the thallus is ‘immersed, inapparent’. The Glossary of LGBI2 defines the thallus as ‘the vegetative body’. The term thallus was used in various ways by different authors and a proposed new definition has been written to be used in a future edition:

thallus, here used to indicate the vegetative structure of a lichenized fungus, and hence excluding structures such as fruiting bodies. Non-lichenized species may form visible wefts of hyphae, or may alter the colour of the substratum, but by this definition these phenomena are not considered to be thalli. In more general biological usage, the term thallus is given to undifferentiated vegetative tissue in diverse groups which were previously known as thallophytes (including algae, fungi and others).

Using the new definition, and if we assume that no photobiont is present (as stated in the generic description in LGBI2) then no thallus is present.

I have taken an interest in ‘bark fungi’ and have attempted to investigate their vegetative parts. Some lichenologists have considered that such fungi probably derived their nutrition from the chloroplasts of the host twig and Brian Coppins has nicknamed them ‘chloroplast botherers’. In several species including *Arthopyrenia punctiformis* I have convinced myself that the hyphae do not penetrate down anywhere near the twig’s chloroplasts, but I have noticed considerable interaction between the vegetative hyphae of the *Arthopyrenia* and superficial algae. My hypothesis is that many of these ‘bark fungi’ function like lichens but with a very loosely organised ‘thallus’.



Fig. 1. Vegetative hyphae of *Arthopyrenia punctiformis* interacting with clusters of superficial algae.

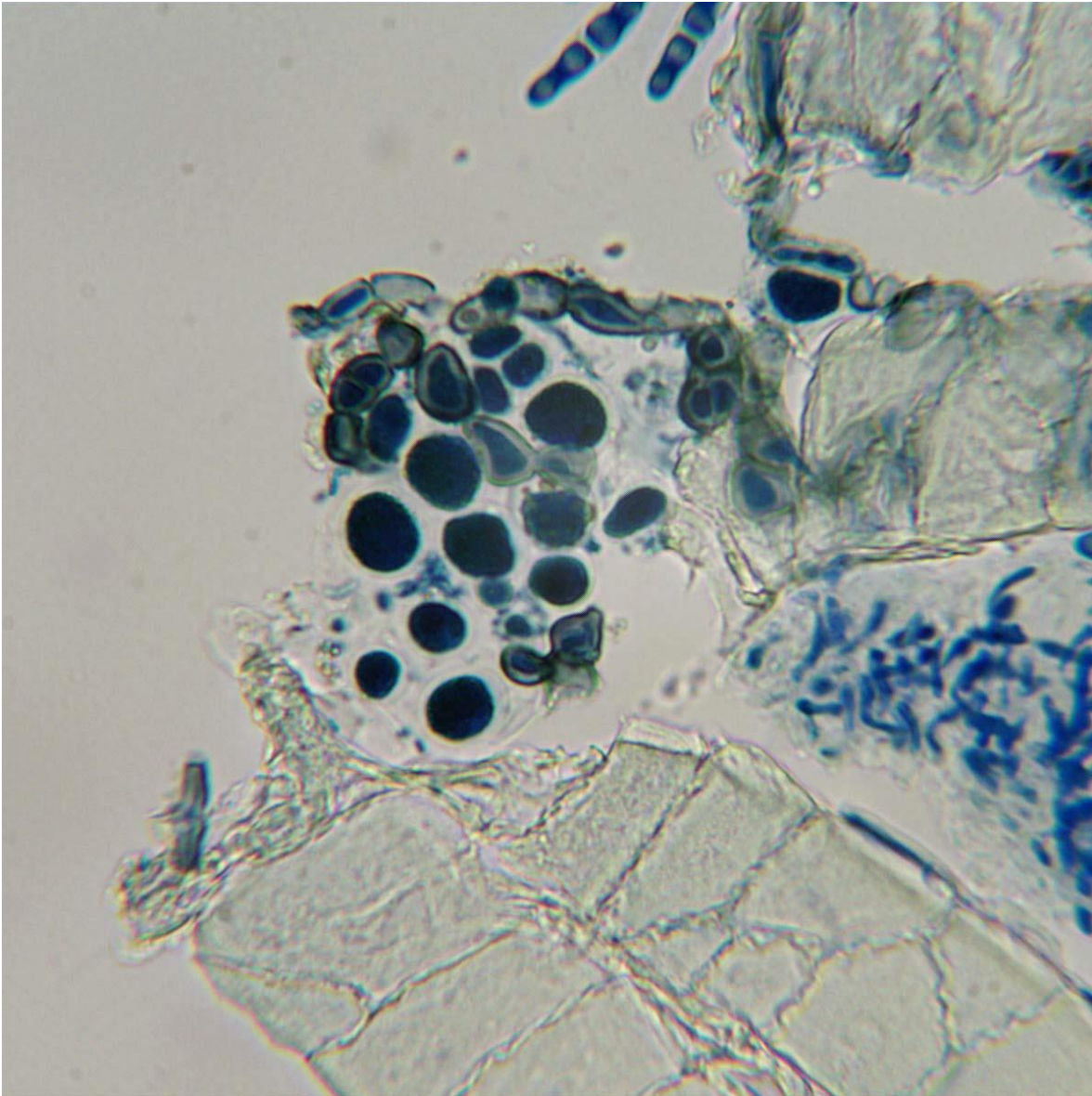


Fig. 2. Apparent intimate interactions between vegetative hyphae of *Arthopyrenia punctiformis* and a cluster of superficial algae.

Despite several careful attempts, I have not been able to observe any interaction of the vegetative hyphae of *P. populneum* with either the twig's chloroplasts or with superficial algae. The Nordic Lichen Flora (Ahti *et al.* 1999) describe *P. populneum* as 'saprobic or parasitic on branches of *Populus*' suggesting similar uncertainty (but without suggesting the possibility of any interaction with superficial algae).

The ascospores of *Phaeocalicium* are described in LGBI2 as '...ellipsoid with rounded apices, dark brown, smooth or warted.' My observations indicate that *P. populneum* has spores with an outer layer surrounding the main spore wall. This outer layer is best observed in slightly immature ascospores mounted in K.

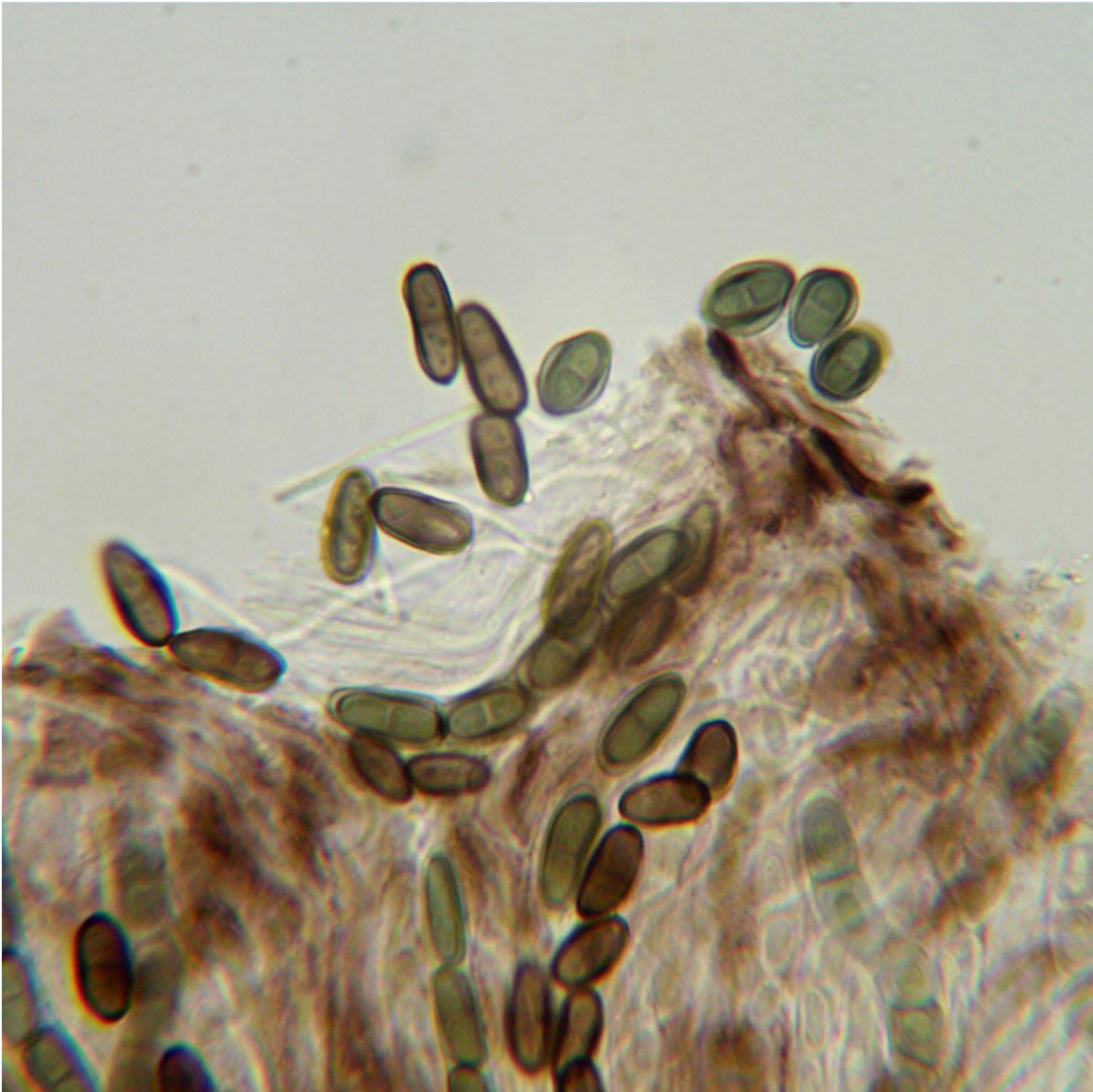


Fig. 3. Ascospores of *P. populneum* showing the presence of an outer layer (best seen in slightly immature spores towards upper right).

When comparing *Phaeocalicium* with other genera, *Chaenothecopsis* is said in LGBI2 to have an ‘ascus apex penetrated by a narrow canal’. The presence or absence of a canal in *Phaeocalicium* is not mentioned in the generic description. Hence it is impossible to know whether it is the presence of a canal or the presence of a *narrow* canal that is supposed to distinguish *Chaenothecopsis*. My observations indicate that an ocular chamber is present but is short and blunt at most stages. The Nordic Lichen Flora gives more information about the ascus in *Phaeocalicium*: ‘Asci with strongly and uniformly thickened apex or the apex is penetrated by a short and blunt canal persisting until the spores are ejaculated.’

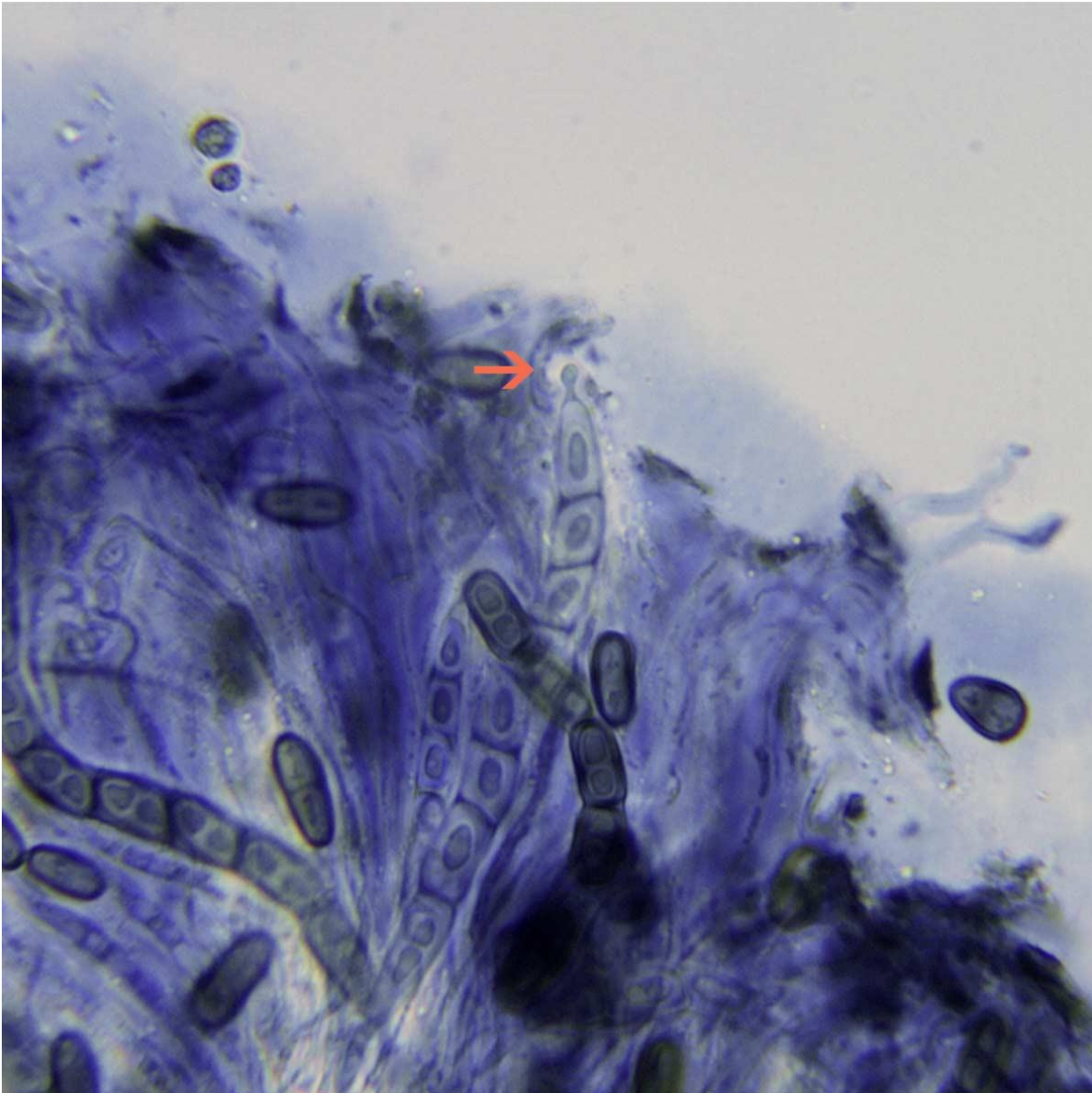


Fig. 4. The arrow indicates the presence of a teat-shaped ocular chamber (filled with stain) penetrating the thickened tholus in *P. populneum*. To see such a well-developed ocular chamber is rather rare, in most cases it is shortly tapering and blunt.

LGBI2 appears to be confused about which of the two British species of *Phaeocalicium* has K+ blue-green pigment in the apothecial stalk. In the key, the presence of such pigment is used to distinguish *P. populneum*. The description of that species just mentions that the inner part of the stalk is K+ red. When comparing *P. populneum* with *P. praecedens*: '*P. praecedens* differs in the simple ascospores, K+ blue-green reaction of the stalk...'. The Nordic Lichen Flora suggests that *P. populneum* has K- or faint K+ reaction of the stalk while *P. praecedens* has a distinct K+ aeruginose reaction of the stalk. I have not examined *P. praecedens* but trust that the K+ aeruginose of that species has been reliably reported. I suspect that both species can be K+ blue-green and this makes the use of this character in the key misleading.

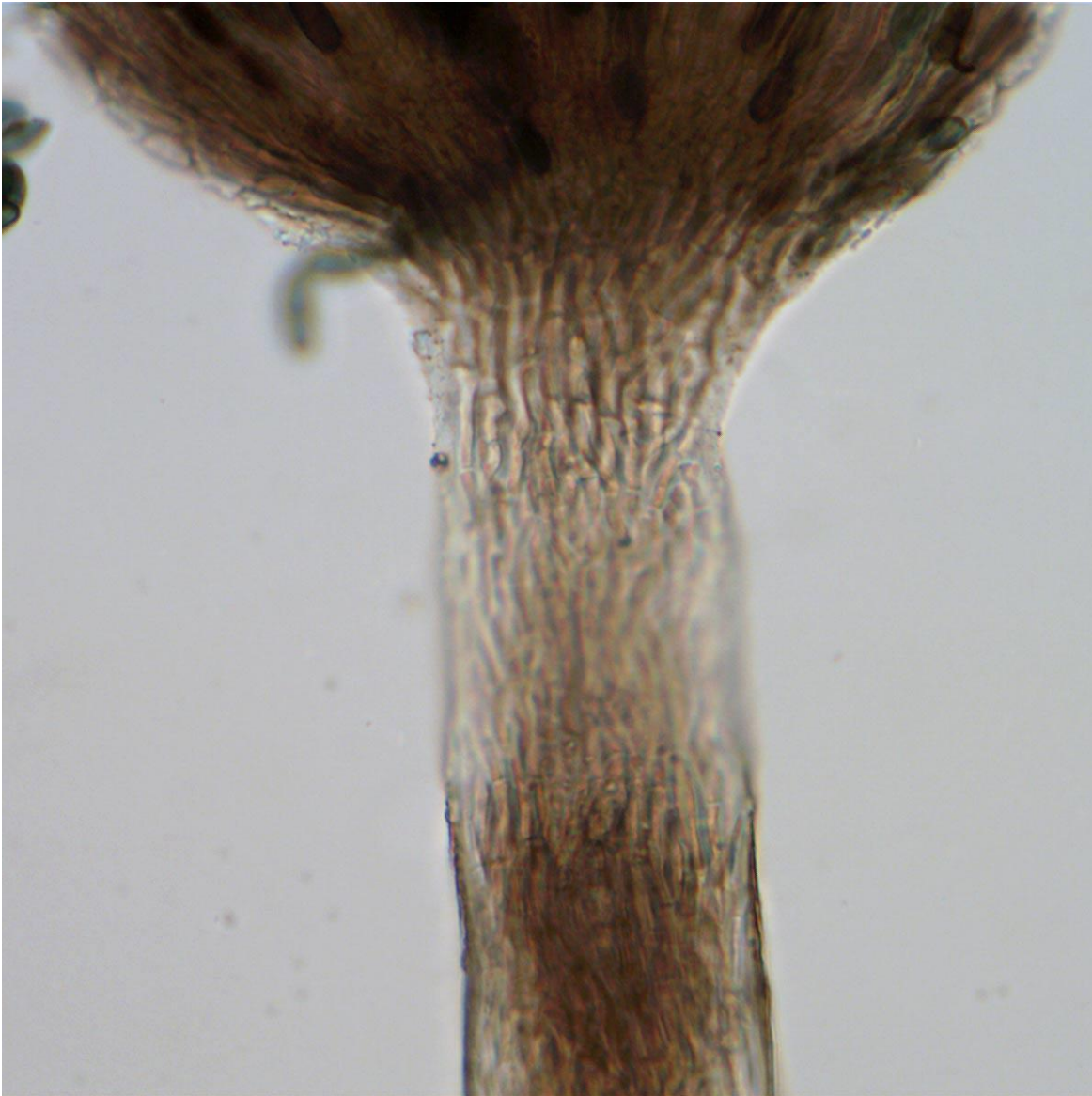


Fig. 5. Apothecial stalk of *P. populneum* in water.

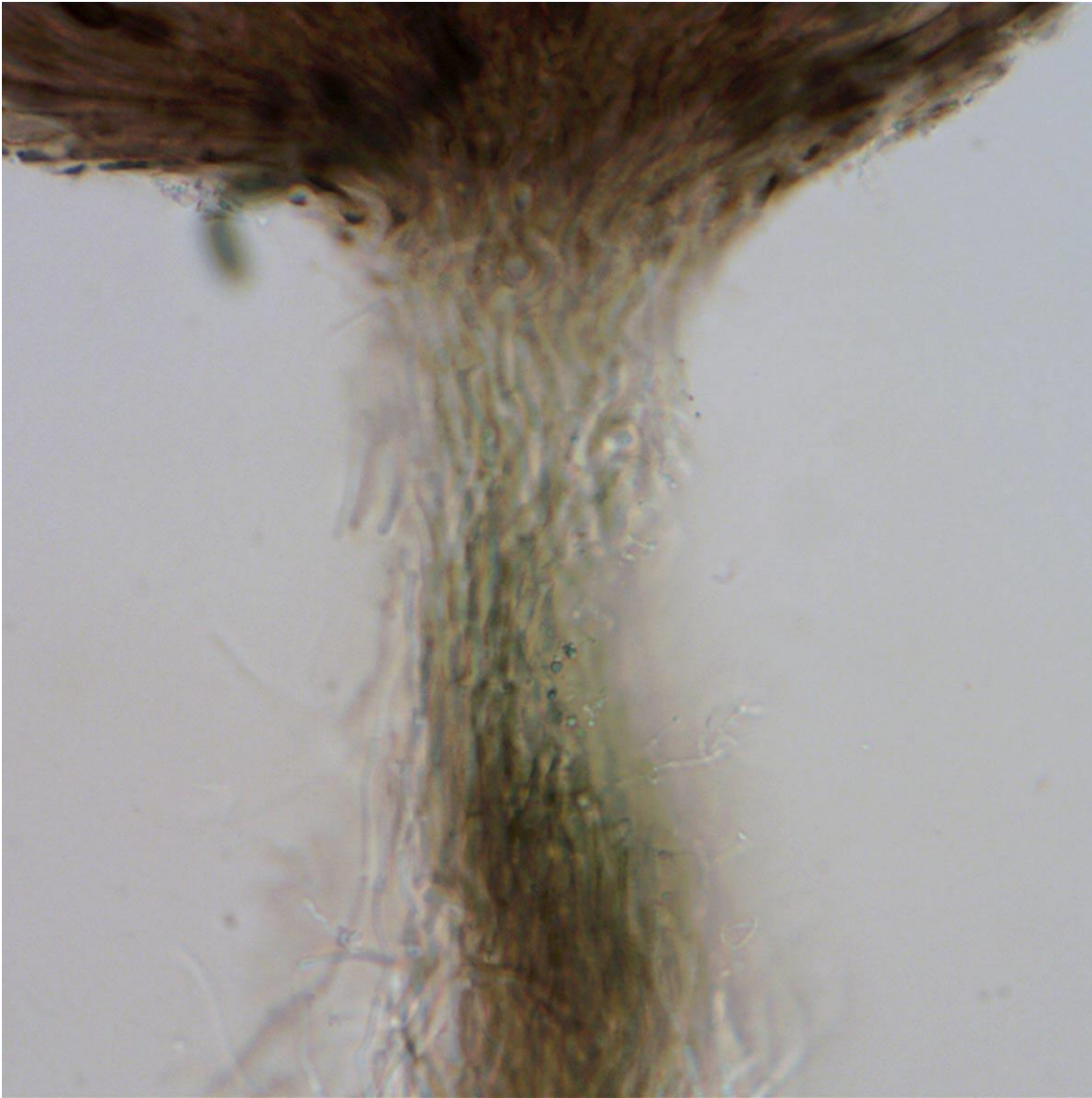


Fig. 6. As in Fig. 5 but after addition of K. Definite K⁺ dull blue-green pigment is present. Some darker stalks show a more intense K⁺ blue-green reaction.

LGB2 states that the outer part of the stalk of *P. populneum* 'consisting of colourless, swollen hyphae'. I do not observe the outer hyphae of the stalk to be significantly different to those within and all of them swell markedly in K. The Nordic Lichen Flora does not mention any swollen hyphae but states that the stalk is 'surrounded by a 2-5 μm thick hyaline gelatinous coat', a feature that I have also failed to observe so far.

The description of *P. populneum* in the Nordic Lichen Flora is more detailed than that in LGBI2 and generally seems more reliable. One small mistake appears to be in the description of the epithecium which is given as 'consisting of layers of anticlinally arranged, sclerotized hyphae'. The epithecium appears to be developed by branching of the paraphyses, the branches becoming largely periclinally arranged above the asci. The effect is similar to that seen in the unrelated *Arthonia muscigena*. Neither LGBI2 or the Nordic Lichen Flora make any other mention of the paraphyses which I find to be moderately richly branched and anastomosed.

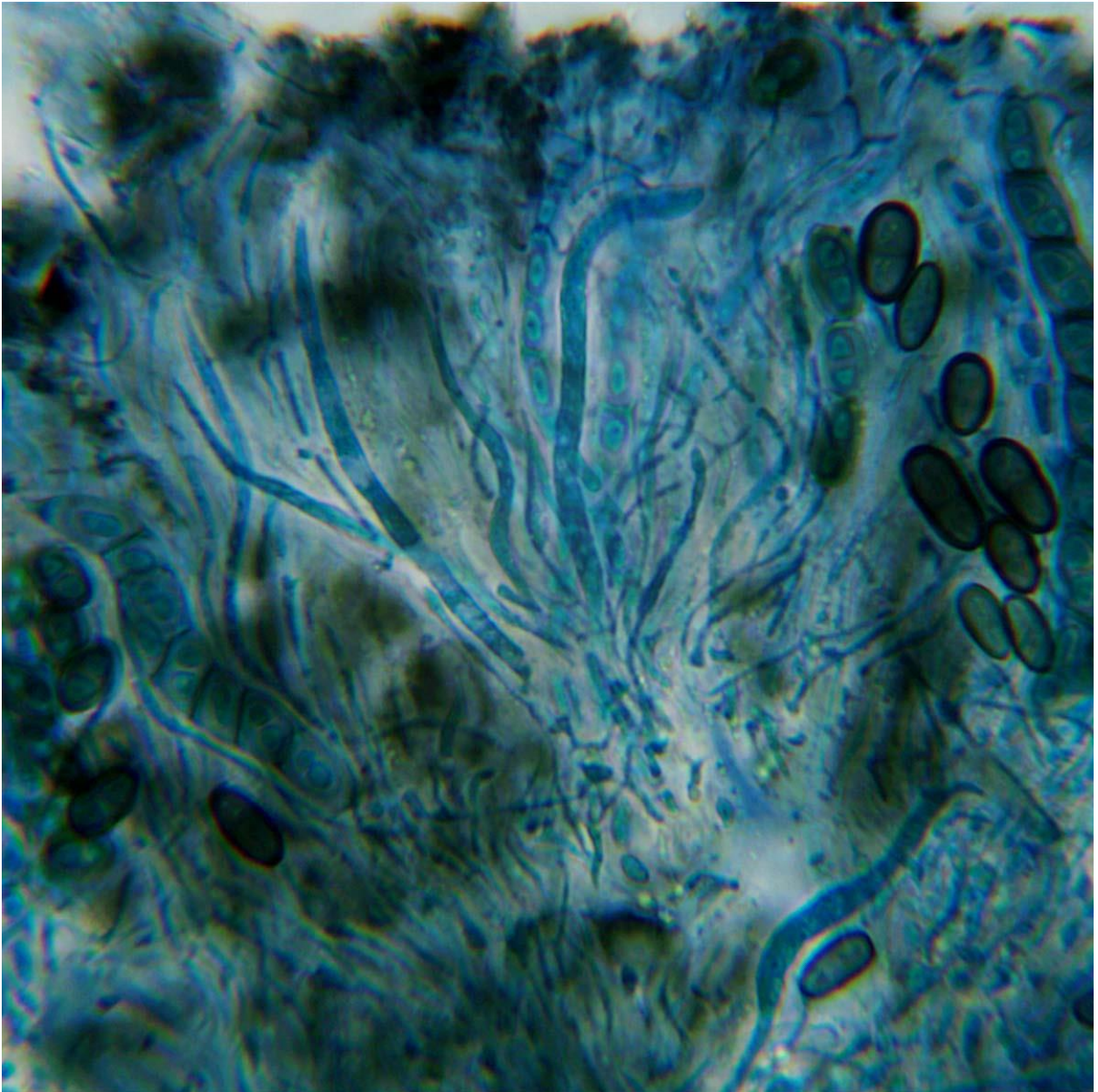


Fig. 7. Hymenium of *P. populneum* (stained) showing the presence of branches and anastomoses. Many of the hyphae near the top of the hymenium tend to lay parallel with the surface (not very well illustrated by this image).