

## FURTHER NOTES ON BASIDIOMYCETES IN CULTURE

BY K. ST G. CARTWRIGHT

(With Plates XV and XVI)

THE fungi investigated were:

*Polyporus fumosus* (Pers.) Fr., *P. adustus* (Wild.) Fr. and *Lenzites trabea* (Pers.) Fr. They were grown on 2 per cent. Kepler's malt extract agar.

### 1. *Polyporus fumosus*

#### *Macroscopic characters.*

*Type of growth.* The mat is at first white cottony, becoming inconspicuously zoned due to the growth being denser near the centre and becoming sodden or more loose and cottony further out. In a mature culture the mat in places becomes slightly coloured a pale cartridge buff but this coloration is never pronounced. The mat is sodden, patchy, appearing slightly farinaceous due to small raised tufts. Finally in cultures six to eight weeks old a smooth raised crust may be formed along the sides of the slant which are in the nature of an incipient hymenial surface. The rate of growth is moderate:

Average rate of growth in mm. per diem			
° C.	mm.	° C.	mm.
15	0·25	27	0·64
20	0·51	30	0·15
25	0·74	35	0·0

*Fruit bodies.* These are formed in two months' old culture in the light as raised, narrow pads cartridge buff in colour (Pl. XVI, fig. 1).

*Secondary spore formation.* Visible as tufts.

#### *Microscopic characters.*

*Hyphae. Aerial.* These are 1–5  $\mu$  in diameter with numerous simple clamps. Branches are often given off from these clamps, which again form clamps, thus giving the appearance that the hyphae are swollen at the septa.

The large hyphae often have two or more clamps at a septum and branches from these may grow downwards parallel to the main hypha, thus giving rise to small strands.

*Submerged mycelium.* Mostly fine, 1·5–2  $\mu$  in width, but large hyphae occur sparingly and these often show irregular swellings and are constricted at the septa.

Clamps are present, though not so numerous as on the aerial mycelium. The mycelium is profusely branched and twisted.

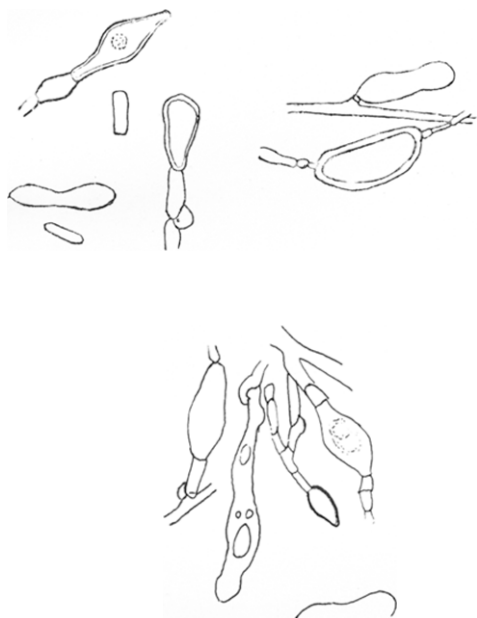


Fig. 1

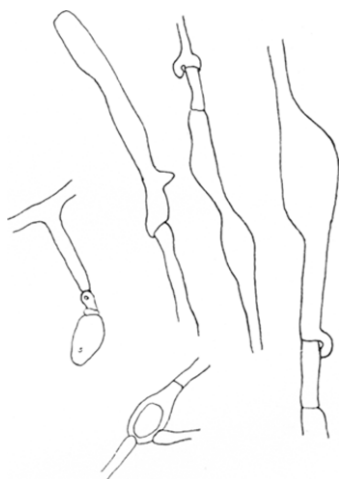


Fig. 3



Fig. 2



Fig. 4

*Clamp connections.* Simple, often proliferating.

*Secondary spores.* Numerous in aerial mycelium, formed in tufts and also scattered. They are mostly terminal, though intercalary ones also occur (Pl. XV, figs. 2 and 3).

*Fruit-bodies.* These possess a hymenial layer with normal basidiospores (Pl. XV, fig. 4). Secondary spores are present on the mycelium below the hymenial surface.

These spores are pear shaped, oval or more rarely irregular in shape, averaging 8–10  $\mu$ , a few as much as 30  $\mu$  in length. They are usually formed in from two to three weeks from inoculation.

*Crystals.* Numerous large rhomboidal crystals occur and in addition a mass of fine crystalline material is formed.

*General remarks.*

The tufts are formed of very closely woven hyphae which, under low magnification, resemble a hymenial surface with young oval to globose basidia, these under higher magnification being seen to be groups of terminally borne secondary spores (Pl. XV, fig. 2).

The culture somewhat resembles that of a weak culture of *Poly-stictus versicolor* and is also not unlike that of *Fomes annosus* but without its coloration.

## 2. *Polyporus adustus*

*Macroscopic characters.*

*Type of growth.* The mat is at first dead white, like fine wool or swansdown in texture, and is even throughout the culture. The growing zone is formed by the fine, almost colourless hyphae closely adpressed to the surface of the medium. In the dark there is a great development of woolly, white, aerial mycelium. The mat finally resembles dense swansdown in texture.

*Colour range.* At first white, changing to pale cartridge buff on ageing.

*Rate of growth.* Moderate, a boiling tube slant being covered in about eighteen days at 20° C.

Average rate of growth in mm. per diem			
° C.	mm.	° C.	mm.
15	0.28	27	0.78
20	0.79	30	0.33
25	0.80	35	0.0

*Fruit bodies.* Not formed.

*Secondary spore formation.* Not visible.

*Microscopic characters.*

*Hyphae. Aerial.* 2–8.5  $\mu$  averaging 3–4  $\mu$  in diameter, possessing swellings at septa only where branching is taking place.

Crystal formation not pronounced.

*Submerged.* Hyphal diameter very variable, 2–9  $\mu$  averaging 4–6  $\mu$ , with small rod-shaped crystals. Some hyphae show swellings and these develop into chlamydo-spores, which are moderately thick walled.

Clamps are numerous. The larger hyphae are much vacuolated and septation is frequent. Branching is also frequent.

*Clamp connections.* Simple clamp connections are present.

*Secondary spores.* These occur sparingly, mostly on the submerged mycelium. They are generally formed terminally, but some are intercalary. In shape they are oblong or irregular. Size up to 10  $\mu$ . They are formed in culture after about three weeks.

*Crystals.* Small rod shaped.

*General remarks.*

The culture somewhat resembles a culture of *Daedalea quercina* and has no very definite characters.

#### *Comparison of Polyporus fumosus and Polyporus adustus*

As these two species of *Polyporus* are somewhat similar in the appearance of their sporophores, it was thought that a comparison of their characters in culture might be of some interest.

From the descriptions just given it will be seen that these two fungi can be readily separated on their cultural characters; they can indeed be distinguished at a glance without the need for microscopic examination (cf. Pl. XVI, figs. 1 and 2). The sparse white mat of *P. fumosus* is entirely different from the somewhat dense mat of swansdown texture formed by *P. adustus*. The differences seen under the microscope are equally as pronounced. In *P. fumosus* secondary spore formation is profuse, whereas in *P. adustus*, although secondary spores are formed sparingly they are not a pronounced feature of the culture and are not formed in tufts on the aerial mycelium as in *P. fumosus*. The large rhomboidal crystals formed in cultures of *P. fumosus* also mark it off from *P. adustus* in which the crystals take the form of small rods.

### 3. *Lenzites trabea*

*Macroscopic characters.*

Mat at first white, fluffy, quickly colouring to orange buff, and to capucin yellow, ochraceous buff, and ochraceous salmon. A mature culture shows profuse growth at the top end of a tube-slant, forming a thick, fluffy, brightly coloured cushion. Aerial development gradually becomes less, the lower portion of the slant showing a scant growth of mycelium only faintly tinted yellow or cream.

The depth of coloration is somewhat diluted owing to the growing tips of the aerial hyphae being paler. On removal of these growing tips the depth of coloration is much more pronounced.

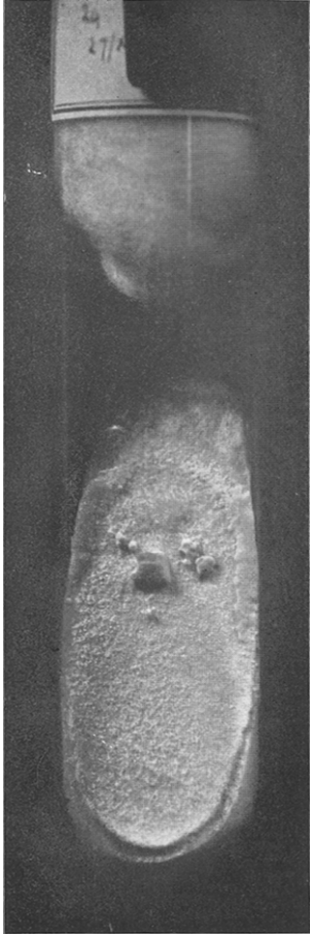


Fig. 1



Fig. 2

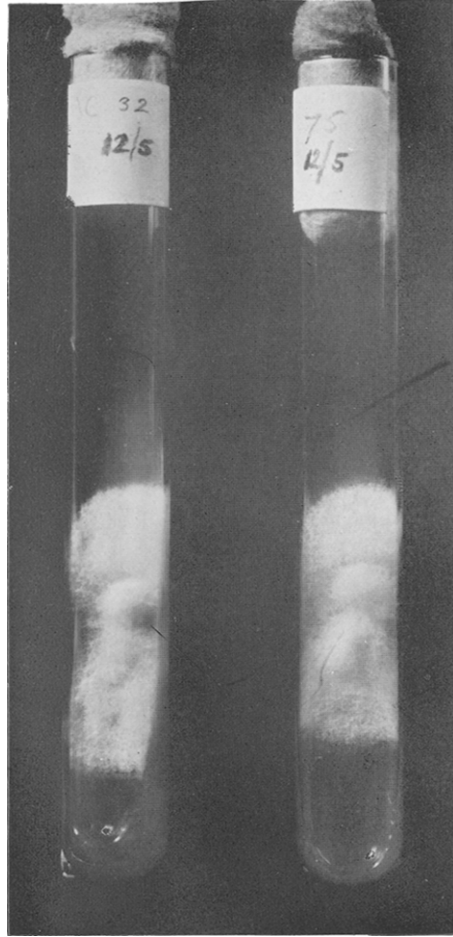


Fig. 3

*Microscopic characters.*

*Aerial mycelium.* Hyaline to yellow in the mass, 1.5–3.5  $\mu$ , branching moderately frequent. The hyphae are somewhat irregular in shape. Clamp connections frequent, some very large and proliferating.

*Submerged mycelium.* Hyaline, 1.5–3.5  $\mu$ , branching often at right angles; clamp connections often proliferating.

*Fruit bodies.* Not formed.

*Secondary spores.* Abundant, formed both in the aerial and in the submerged mycelium, very irregular in shape, oblong oval to ellipsoidal, and formed terminally and intercalary, 6–40  $\times$  5–10  $\mu$  (Pl. XV, fig. 1). Crystals formed but not of value for the identification of the species.

*Remarks.*

This culture is easy to identify from the macroscopic characters of the mycelial mat and the characteristic colour. The secondary spores are also larger on the average and more irregular in shape than is usual.

A further characteristic is found in its temperature relations, the fungus having a high optimum for growth.

Owing to this its range of distribution appears to be large, as it is not restricted to temperate climates.

It causes a brown cubical rot often in pockets.

The mycelium in the wood shows numerous medallion clamps as well as the simple form, and it is probable that this species takes the place of other species of *Lenzites* in hot countries such as the Sudan.

The culture of *Lenzites trabea* was received through the courtesy of Dr Audrey Richards of Madison.

This culture has been compared with a culture of *L. thermophila* Falck from the Centraal Bureau voor Schimmelcultures, Baarn, with one received direct from Falck (Pl. XVI, fig. 3), and also with a culture kindly sent to us by Dr Liese of *Trametes protracta*.

The four cultures are identical in every respect.