

Notes on an Unusual Fungal Diet

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Cladosporium resinae (Lindau) de Vries

C. resinae (the sexual or 'perfect' state, Ascomycete *Amorphotheca resinae* was described by Parbery in 1969), (Lat. *resinae*, of resin).

The asexual state of *C.resinae* is considered to be very variable, a number of forms arising from the one hypha although all forms apparently have the same perfect state *Amorphotheca resinae* Parbery, suggesting that many different strains of the fungus possibly exist. Dubbed by Hendey (1964) the "kerosene fungus", it lives on plant resin and various petroleum products such as creosote, kerosene, diesel and aviation fuel.

Known for the last century, it was best known from wood impregnated with creosote or coal tar, which the fungus uses as a source of carbon. The carbon utilisation of *C.resinae* is well illustrated by the growth pattern on creosoted timber; the growth stops on reaching that section of the timber not treated with creosote.

In more modern times, the rise of the use of petroleum-based lubricants has seen *C.resinae* become a serious problem in some manufacturing industries. Growing on machine lubricants, when moisture is present, the mycelial mass formed causes clogging of filters, increases lubricant viscosity and corrosion of bearings.

With the vast amounts of petroleum products in storage and in the fuel tanks of vehicles, aircraft and ships, *C. resinae* has exploited this resource, sometimes with unfortunate results. Typically the fungus grows at the bottom of the fuel tank where free water is available. At the interface with the petroleum product a mycelial mat is formed, producing a sludge that as it is dispersed causes serious blockages to the fuel system components. The fungal digestive metabolites produced degrade fuel quality and corrode metals, particularly aluminium (Hendeby (1964).

As many aircraft have fuel tanks that are structural components of the wing, it has been suggested that some unexplained crashes of aircraft, especially during World War II, might be as a result of fungal corrosion. Noteworthy, some years ago, it was reported in the popular press, that the whole of the Indonesian Air Force was grounded by *C. resina* that was growing in the fuel tanks and had corroded the aluminium walls of the tanks.

To make the situation even worse, fuel tank linings, particularly some of the early synthetic rubbers, are quickly degraded by the fungal metabolites, releasing nitrogen and minerals, enhancing the nutrient environment for rapid fungal growth and tank corrosion.

As it is necessary for free water to be available for the fungus to grow, the potential harmful effects of *C.resinae* are now managed by regular, strict and diligent maintenance procedures, particularly for aircraft, that ensures early removal of any water condensates and where necessary, selecting an appropriate material composition for tank linings.

References

- Hendeby, N. I., 1964: Some observations on *Cladosporium resinae* as a fuel contaminant, and its possible role in the corrosion of aluminium alloy fuel tanks. *Trans. Br. Mycol. Soc.* 47 (4): 467-75.
- Parbery, D.G. (1969): *Amorphotheca resinae* Gen. Nov. Sp. Nov.: the perfect state of *Cladosporium resinae*. *Aust. J. Bot.* 17: 331-57.