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CAUSED BY A NEMATODE (DITYLENCHUS SP.),
EVIDENCED BY SURFACE DEVELOPMENT OF PREDACEOUS FUNGI

by

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For several years a disease has been apparent in commercial mushroom beds, characterized by the disappearance of the mushroom mycelium in the beds and the development on the soil surface of a sparse fungus growth usually referred to Cephalothecium. As a rule, the disease is first noticed at about the time of the third flush in areas 3 to 6 feet in diameter. In typical cases the mushroom mycelium is completely destroyed in the affected areas and the compost acquires a fetid odor. The surface of the bed becomes sunken and irregular in the diseased areas as a result of the decomposition of the underlying compost and affected areas progressively encroach on the healthy portions of the beds.

The fact that a surface mold is always associated with the disease has led to the prevalent belief that the "Cephalothecium" apparent on the bed surface is causing the disintegration of the mushroom mycelium in the bed. On the other hand, the sparse nature of the fungus growth over the surface of the soil and the absence of a conspicuous fungus growth in the compost have raised doubts as to the extent of the damage caused by the fungus. Mites, springtails, and nemas from time to time have been suspected of consuming the mushroom mycelium; but here again the constant association of the fungus with the disease caused observers to hesitate to attribute the damage to these bed invaders. Consideration of the disease has remained in this stalemate for about ten years. Meanwhile the disease has been appearing in an increasing number of houses and has assumed considerable economic importance in the mushroom industry of eastern Pennsylvania. The identification by Drechsler of the surface molds as fungi normally predaceous on nemas suggested a re-evaluation and orientation of the role of the nemas and of the surface fungus in the "Cephalothecium" syndrome.

Compost was examined for the presence of nemas from diseased areas in nine separate mushroom establishments in Chester County, Pennsylvania, and in two near Hockessin, Delaware. In all cases an undescribed species of Ditylenchus has been observed feeding on the mushroom mycelium. The nema population in the compost varied considerably with the different collections; but whenever the samples were taken from portions of the bed that were evidently in the process of disease invasion the nemas were extremely numerous. The surface mold developing in diseased areas has

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been cultured and identified from three separate locations as Arthrobotrys superba Corda. Previous observers of this disease were undoubtedly collecting the same fungus but mistakenly referred it to Cephalothecium which resembles Arthrobotrys and has been frequently confused with it for nearly a century. It is anticipated that upon further study additional species of predaceous fungi will be found capturing the nemas.

All of the evidence at hand suggests that the symptoms usually associated with the Cephalothecium disease may be explained on the basis of the invasion of the beds by nematodes in sufficient numbers to consume the mushroom mycelium, followed by the development of predaceous fungi which prey upon the nemas and sporulate on the surface of the soil. The possible role of secondary microorganisms as aids in the disintegration of the mushroom mycelium must of course be taken into consideration. Observations of mushroom growers suggest that in some cases the nemas remain in the mushroom house between crops, presumably in the bed boards, while in other cases they are introduced with compost or casing soil.

The nematode is a new species related to the well-known Ditylenchus dipsaci. (A taxonomic description will be published elsewhere.) D. dipsaci is now considered a group of species most of which are plant pests attacking such hosts as hyacinth, narcissus, bulbous iris, tulip, phlox, hydranges, alfalfa, clover, strawberry, rye, oats, potato, tobacco, sweetpotato, and many others. While all these species infect phanerogamic plants, the present one is the first that is apparently entirely mycophagous in its habits. It punctures the mushroom mycelium and feeds on the contents of the hyphae, destroying them directly or indirectly. Like other members of the genus the present species appears capable of rapid growth and propagation, eventually building up enormous numbers which migrate and spread through a mushroom bed and effect the destruction of the mycelium on an advancing front. If this new Ditylenchus is similar in behavior to its relatives, it should be able to go into dormancy during drought and other adverse environmental conditions and thus survive in dry debris and dry remains from infected mushroom beds for months or even several years. Such debris and remains are possibly the main source of reinfection. Investigations to determine this matter as well as to ascertain the life cycle of this new species and other facts of significance for an understanding of the present disease have been initiated. Methods of control are also being studied.

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