Nematodes

Parasitic and saprophytic species of nematodes associated with commercial mushroom growing are routine inhabitants of most agricultural soils.

Common Names

Eelworms, Cephalothecium disease

The Pathogen

Aphelenchoides composticola, Ditylenchus myceliophagus, Rhabditis sp.

Parasitic nematodes possess needlelike mouth parts capable of drawing out the contents of a mushroom cell. The mouth of the saprophytic nematode is built for chewing. Saprophytic (free-living) nematodes ingest bacteria, protozoa, and fungal spores, but do not attack the mushroom mycelium. Large populations of saprophytic nematodes *(Rhabditis* sp.) may produce by-products which adversely affect mushroom spawn growth, but the extent of this is still to be proven. One fact regarding nematodes is certain – if present in the compost, they either survived Phase II pasteurization or over-cropped in the woodwork of the growing room. Pasteurization of compost and wood is a keystone in mushroom-farm hygiene, so the presence of nematodes suggests a failure in sanitation procedures.

The primary symptom associated with the parasitic nematodes *Aphelenchoides composticola* and *Ditylenchus myceliophagus* is a degeneration of the mushroom mycelium in the compost. Normally, an infestation is noticed at the time of third break, with the development of nonproductive areas 1 to 2 feet in diameter. If nematodes are present in the compost at spawning, the spawn's mycelium will grow slowly and degenerate; mushrooms will not form. Mycelium in affected areas is completely destroyed and as the compost decomposes, it turns black and a medicinal odor is detectable. Surfaces of nematode-infested areas sink and take on an irregular appearance as a result of compost decomposition. Infested areas enlarge as the nematodes migrate to new feeding sites. Since 1964, efforts by the authors to collect parasitic nematodes at a number of North American mushroom farms have been unsuccessful. Growers are advised to remain vigilant by periodically assessing the nematodes present with identification to the genus level.

Saprophytic nematodes (*Rhabditis* sp.) have been repeatedly collected by the authors during this same time period. These, too, may be associated with the disappearance of spawn and the breakdown of compost into a black soggy mass. Normal-looking spawn-run compost may be found with high populations of saprophytic nematodes, even though mushroom production may be good in such locations. Production may range from very poor to good. Saprophytic nematodes sometimes form into moist glistening swarms appearing as upright cylindrical aggregates swaying to and fro on the surface of the casing. Such swarms can be seen without magnification by directing a beam of light at an angle 45" to the casing; the motion of the swarms is what makes them obvious. Eggs, larvae, and adults can serve as inoculum. Nematodes are transported to the crop through infested compost, peat moss, and soil; transport on dust particles and mushroom flies also occurs. Transportation from infested to noninfested areas occurs on tools, on clothing and hands of workers, and on flies. The nematodes will over-crop in inadequately pasteurized wooden boards and may survive in compost inadequately pasteurized during Phase II. Saprophytic nematodes can multiply in ceilings made of wood or concrete, and in ceiling insulation. Once a ceiling is infested, water droplets condensing on the ceiling will contain the nematode larvae or their eggs, and the crop becomes infested via the falling droplets.

A nematode infestation is sometimes accompanied by the superficial sparse growth of the fungus *Arthrobotrys superba*, a parasite of the nematode. This mold appears as a whitish cast on the surface of the casing in an area - up to 4 or 5 feet in diameter - usually lacking mushrooms. Bacterial blotch has been associated with parasitic and with free-living nematodes, as both are vectors of the bacterial blotch pathogen. Killing the nematodes wherever they over-crop is the only means of control.

Reference

Wuest, P., and G. D. Bengtson. 1982. Penn State Handbook for commercial mushroom growers. The Pennsylvania State University, University Park.

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