Green Mold of Mushrooms

Green mold is characterized by dense white mycelial growth followed by extensive green sporulation of the fungus.

Symptoms and Effects

When mushroom beds spawned with the cultivated mushroom, *Agaricus bisporus*, are infested with *Trichoderma* green mold, non-productive areas occur on the casing surface (Fig 1) resulting in serious yield losses. *Trichoderma* spp. have traditionally been found as weed molds in compost, causing only limited green patches on casing/compost or cap spotting on mushrooms. However, in the early 1990's a new strain of *Trichoderma* was responsible for a green mold epidemic in Pennsylvania. This strain was identified as *Trichoderma harzianum* biotype 4 (Th4).

Figure 1. The bag on the left shows casing with healthy spawn growth, while the bag on the right shows the effects of green mold caused by *Trichoderma harzianum* biotype 4 (Th4).

Green mold is characterized by dense white mycelial growth followed by extensive green sporulation of the fungus (Fig 2). Apparently normal spawn runs can give way to large patches of green *Trichoderma* sporulation (Seaby 1996). From 1994-96, crop losses in Pennsylvania ranged from 30 to 100% (Wuest et al. 1996). Crop losses to green mold are variable, however, since the onset of the disease in Pennsylvania crop losses have been estimated in excess of $30 million. *Agaricus* rhizomorphs often exhibit browning reactions and basidiocarps may be covered with green mold or secondary invaders such as *Penicillium*.

Figure 2. Dense white mycelial growth is followed by green sporulation.

The pathogenic fungus appears to gain entry to growing rooms primarily through contaminated personnel and equipment. Other sources include poorly composted substrate or carryover in rooms that were not sufficiently steamed off. Once introduced, Th4 rapidly interacts with *Agaricus*, spreading into large disease areas from infestation foci. Browning of *Agaricus* mycelium and lysis of small pins is visible macroscopically at the advancing edge of green mold and suggests enzymatic degradation. (Fig 3) Microscopic investigations have shown *Agaricus* mycelial collapse and cellular disorganization. Compost infestation results in green sporulation which can turn into black patches uncolonized by mushroom mycelium. These patches may eventually be colonized by *Agaricus* and fruit, but yield is greatly reduced.

Figure 3. Small pins turn brown and appear to lytically degrade

Although unspawned compost does not support high levels of green mold, the nature of the interaction between the mushroom mycelium and *Trichoderma harzianum* biotype 4 (Th4) is not understood. Green mold causes significant yield losses of *Agaricus* button mushrooms, as well as specialties such as *Shiitake* and *Pleurotus*.

References

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