

Honey fungus

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Identification, Biology & Management

A disease worldwide in distribution that affects hundreds of species of fruit, shade and forest trees as well as shrubs, both in the temperate and tropical regions. The disease is often known as shoestring or bootlace root rot, mushroom root rot, crown rot or oak root fungus disease. In the UK it is known as honey fungus (*Armillaria mellea*).

Symptoms

Symptoms of root attack can be expressed in several ways. A tree may die after a period of increasing ill health or show a general deterioration in crown condition indicating root or root collar problems. Other trees exhibit no outward symptoms, but simply blow over due to rotted roots. The death of other trees and shrubs in the immediate area is usually a symptom that indicates the presence of honey fungus.

The rot caused by honey fungus is stringy and wet. Resin, gum or watery liquid may bleed from the lower stem of affect plants. In the autumn, clumps of honey-brown toadstools, similar in appearance to the cultivated mushroom, appear near or at the base of infected plants. Clumps of honey mushrooms are frequently seen growing at the base of tree stumps. Toadstool stems are white and their spore prints white or cream.

A fan-like, whitish mat of fungal tissue (mycelium) is often found under the bark of *Armillaria* infected trees. Rhizomorphs, which resemble black bootstrings, may also be present (Figure 1). These function to carry water to the wood from the soil to aid in decay. The best evidence that honey fungus (Figure 2) is the primary cause of death, and not just present as a secondary attacker, is the presence of mycelial fans under the bark of roots or root collar of dying, but not completely dead trees.

Figure 1: Distinctive boot laces (rhizomorphs) caused by honey fungus



Causal Agents

Armillaria is both a plant pathogen, killing roots, and a wood decay fungus, causing living or dead trees to blow over. It lives saprophytically on stumps and buried wood for years when no susceptible tree roots are near. Most plants are more susceptible to honey fungus when young, becoming more resistant with age. Once diseased, trees cannot be cured; however, larger ones can survive for many years.

There are at least five distinct honey fungus species in Europe with each species varying in their ability to cause disease.

Figure 2: Distinctive honey coloured mushrooms



Control

Sanitation: Control of honey fungus is not usually attempted under forest conditions. In landscape situations remove from the site all sources of infection. This usually means removing infected stumps, including major roots as thoroughly as possible. Methods that claim to destroy the stump by burning, rotting or dissolving are not effective. Small stumps can be dug out by hand, while larger ones may need to be removed with winches or power equipment (JCB). Where stumps cannot be dug out, chipping or grinding is an option.

Replace infected soil with disease-free topsoil. Replanting can usually be safely done immediately. If chippings are left in the soil, delay replanting for a season. Honey fungus may be present on plants that do not show any symptoms or signs. Therefore, if woody plants are removed for any reason, it is wise to remove the stump as well so the fungus cannot build up and attack other nearby plants.

Restriction: If infected stumps and roots cannot be removed, efforts using physical barriers to prevent the spread of the fungus have been successful. It is possible to separate the source of infection from healthy plants by installing a root barrier vertically between the two. The barrier should extend from just above the soil to at least 45 cm below the ground as rhizomorphs can grow below a shallow barrier.

Cutting of rhizomorphs is another method that may successfully protect nearby susceptible plants. Separate the diseased from the healthy plants by digging a trench, as deep as possible, between the two several time a year. In shallow soils it may suffice to insert a spade periodically along a line between diseased and healthy plants. This treatment should be continued until the stump rots away and the danger of spread has passed. Restriction may not be a practical solution except in extreme cases.

Chemical Control: Soil fumigation/drenching of the infested area with phenolic emulsions are now banned. Drenching of the area to sterilize the soil with Jeyes fluid may be permissible in certain instances. However, all information to date points to the fact that once infected a tree cannot be cured of honey fungus.

Plant Resistance: Plant vigour is an important factor in increasing resistance to attack by some strains of *Armillaria*. The fungus is often referred to as “a pathogen of opportunity.” Trees are predisposed to attack by factors such as damage from construction, defoliation, and drought. Over-mature trees are also more prone to attack due to their slow growth and low vigour. Keep vigour high by preventing these stress factors, and increase resistance in stressed trees by fertilisation, watering and mulching.

Root collar excavation (RCX): with an air-spade has recently been shown to be an effective means of reducing spread and infection rates caused by honey fungus if infection is at an early stage.

Bio-control: Apply a Trichoderma based soil bio-control agent in combination with RCX to act as a long term natural root protectant system.



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