RESEARCH LABORATORY TECHNICAL REPORT

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Holly Leaf and Twig Blight

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Leaf and twig blight on holly (*Ilex* spp.) is a common disease in the UK and Ireland. This disease is caused by a fungus-like organism called *Phytophthora ilicis*. There are many well-known pathogens in the genus *Phytophthora*, most of which cause root rots or trunk cankers, including the 'Sudden Oak Death' pathogen *P. ramorum*. *Phytophthora* species require free water (either in the soil or on the plant surface) to complete their infection cycle as their spores are able to swim to new host tissue and infect. Excess moisture is, therefore, an important factor in any *Phytophthora* disease situation.

Symptoms

Symptoms of holly leaf and twig blight normally begin as small purple to black spots on the leaves (Figure 1) or necrotic clusters of berries. As the disease progresses, the spots develop into purple or black blotches (often along the leaf midrib) and the infection will also move into the twigs and stems causing dieback, defoliation, and cankers (Figure 2). Cool temperatures and moist weather favour disease development. Inoculum most likely persists in soil, and is also produced on infected plant parts. During wet and cool spring or autumn weather, spores splash onto leaves from the soil or other infected areas, penetrate the tissue, and cause the initial leaf spot symptoms. Often the symptoms will be worst on the lowest leaves and branches where inoculum from the ground has splashed up onto the foliage.

In the UK, the disease primarily affects *I. aquifolium*, *I. crenata*, *I.* x *altaclarensis*, *I. dipyrena* and *I. kingiana* and has been found on *I. colchica*, *I. pernyi* var. *veitchii* and some clones of *I. apaca*.

Figure 1: Necrotic areas on holly leaves caused by Phytophthora infection

Treatments

There are several simple cultural methods which can dramatically reduce the severity of this disease. Pruning plants to increase air circulation and light penetration will help avoid moisture on the leaf surfaces which is necessary for infection. Also, overhead sprinkler irrigation that wets foliage should be avoided. If the affected holly is grown as a tree, the lowest branches can be pruned in order to reduce the likelihood of inoculum splashing up from the soil.

In addition to cultural control methods, there are some chemical control options that may help reduce infection. *Phytophthora ilicis* management can be achieved through an application of the soil drench fungicide Subdue in early spring, followed by a soil drench application of phosphite fertiliser in mid to late summer (August to September). An application of the bio-fungicide *Bacillus subtilis* (Serenade) is also advised; one application should be applied annually in early autumn or late spring when the soil is warm and moist. Repeat applications of phosphite can be made throughout the year, up to three applications per year if the disease is severe. Where bleeding cankers are present, a stem drench with phosphite to a height of 2 metres in addition to the soil drench is advised.
Keep in mind however, that conditions conducive to disease development must be corrected before stopping treatments in order to manage this disease long-term. Soil moisture is of particular importance where soils are poorly drained and prone to flooding. In these cases improve drainage or if possible use species that are tolerant to waterlogged/flooded soil conditions.

Ensure the root collar is exposed and free of soil and mulch.

If the soil is compacted, prepare the planting area by cultivating and incorporating organic matter.

Use soil moisture probes to monitor soil moisture conditions.

Collect and destroy fallen diseased leaves. Check the plant, and any other *Ilex* plants nearby, for cankers. If possible remove and destroy infected stems, sterilizing tools between cuts.

Figure 2: Distinctive "arch" shaped defoliation and dieback caused by holly leaf and twig blight

Avoid excessive mulch on susceptible tree species. A 5cm maximum mulch depth is recommended. Favour coarse mulches such as coarse wood chips. Avoid shredded bark products that tend to compact and hold water.

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