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Commentary

Crown Gall Disease: Strategies for Prevention and Management

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DESCRIPTION

Crown gall is a plant disease caused by the soil-dwelling bacterium *Agrobacter tumefaciens*. This bacterium causes abnormal growths or swellings on the roots, twigs and branches of euonymus trees and other shrubs, mainly of the rose family. Bacteria stimulate rapid growth of plant cells leading to the formation of tumors. In addition to being unsightly, acne also weakens and inhibits plant growth. Although galls can disrupt the flow of water and nutrients to roots and branches, they generally do not cause complete death of the tree. The disease can spread to other susceptible plants through contaminated soil and tools. Most chemical treatments are ineffective.

The canker sores of forsythia, honeysuckle, highbush cornflower, American elm, hickory, maple, oak, and sycamore are thought to be caused by a fungus, *Phomopsis* sp. Since its culture control is the same as for bacterial bile, both are treated together here. However, chemical treatments will vary. Gall-forming bacteria live in the soil and survive for many years. The bacteria may initially penetrate the roots of the infected plant. It then spreads through soil and water movement or by contaminated pruning tools. Bacteria enter the plant through wounds that can be caused by chewing insects, plant damage, or grafting and pruning tools. Crown gall bacteria are known to survive for more than two years in soil in the absence of susceptible plants. It can live for several years in decomposing galls buried underground.

Pathogen-free plants grown in uncontaminated soil will not develop cancer. This emphasizes the importance of growing clean propagating material in clean soil. Good hygiene and good cultural practices are important preventive measures against gallstone disease. Dispose of all symptomatic nursery plants to avoid contaminating healthy plants and storage facilities. When harvesting, leave rotten plants in the field for later collection and disposal. If possible, choose less susceptible rootstocks, avoid planting sites infested with root-attacking insects and nematodes, disinfect pruning equipment between plants, and apply management practices to minimize injury. Avoid planting in heavy and wet soil. Do not plant plants deeper than plants growing in the nursery. If possible, incubate dormant seedling roots at 73°F to 76°F for 10 to 14 days to heal wounds and reduce susceptibility to tumor-causing agrobacteria before planting in moist soil. Use irrigation water from a well if possible.

Integrated pest management strategy

Prune infected material: Crown gall cannot be removed from shrubs although infected plants can live for many years. To improve the plant's appearance, prune and destroy infected stems below the damaged area. Disinfect pruning tools after each cut with a mixture of one part bleach and nine parts water.

Destroy infected plants: Destroy infected plants. Bacteria will survive in the soil, so it is important to grow disease-resistant plants. If the same species is grown in the area, remove and replace the soil or consider sterilizing the soil.

Soil disinfection: Soil known to be contaminated with gall bacteria can be disinfected with chemicals, heat or antibiotics. This is not practical for most home gardeners. A biological control measure was applied using bacteria, radioactive *Agrobacteria* strain 84. This bacterium has been shown to be antagonistic to gallbladder bacteria. It is available for use as a pre-planting treatment by soaking seedlings in a live bacterial suspension in water.

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