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FACT SHEET

RHODODENDRON TISSUE PROLIFERATION

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WHAT IS TISSUE PROLIFERATION?

Rhododendron Tissue Proliferation (TP) is a condition that causes tumor-like growths and shoots to form at the base of many cultivars of *Rhododendron*. The majority of susceptible cultivars are elepidotes, but some lepidote and Azalea cultivars can be affected. It can also affect *Kalmia latifolia*, mountain laurel.

IDENTIFICATION:

TP can first be noticed in young plants as an area of hard swollen tissue growing near or below the soil line (Figure 1). Early symptoms can look similar to crown gall caused by the bacterium *Agrobacterium tumefaciens* (Figure 2); however, true crown gall of *Rhododendron* typically occurs at stem junctions on the aerial branches, rather than at the crown.

Later, the tissue swelling will start to differentiate into small shoots appearing at the base of the plant (Figure 3). These may be found entirely below the soil line and require some digging to identify. These are a telltale sign of TP, as gall-forming pathogens of *Rhododendron* are not known to form organized sprouts at the base of the plant.
In older plants, TP may appear as small to normal-sized shoots originating from the base of the plant.

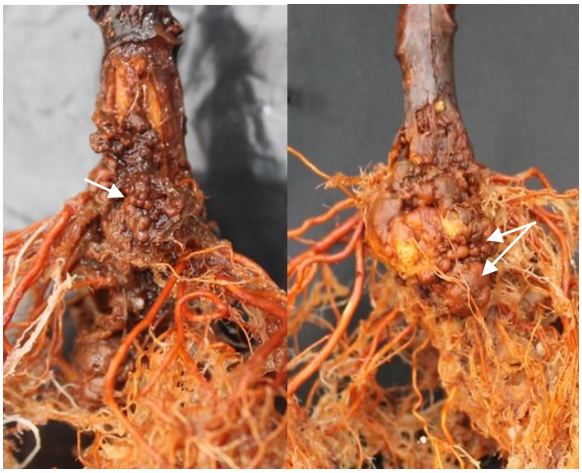

Figure 1. Early symptoms of Tissue Proliferation may include tumor-like swollen tissue near the soil line. Plants were photographed one year after planting.

Figure 2. If no shoots are visible, Tissue Proliferation can appear as a gall at the crown of potted plants. However, this is not true crown gall disease and is not caused by bacteria.

Figure 3. Nodules later develop into a mass of tiny floret-like shoots. Those above the soil line turn green and leaf out. This plant was photographed about two years after planting.

EFFECTS:

Rhododendron plants may survive and even maintain a healthy appearance for years with TP. A 1994 study at CAES found no differences in plant growth or susceptibility to disease or insects between TP and non-TP plants. However, economic losses can occur when visible symptoms cause the plants to be rejected by retailers and consumers. In cases where the callus growth is extensive, there may be a reduced root system and overall reduced vigor of the plant. Severe cases could potentially girdle the roots and cause visible growth defects.

CAUSES:

The causes of tissue proliferation are unknown. No pathogenic bacteria, fungi, or viruses have been found associated with the disorder, despite many attempts to identify some. Attempts to "infect" healthy plants with extracts from TP plants did not cause TP to spread to the healthy plants.

TP is strongly associated with plants propagated from tissue culture, and with cuttings originating from tissue culture propagated plants. TP has rarely been reported on plants originating from cuttings from non-tissue cultured plants or from seed.

One study found that tissue from TP plants can form shoots without addition of the plant hormone cytokinin, while non-TP plants require cytokinin to form shoots. Some scientists have proposed that propagation conditions and hormones may cause the TP plants to abnormally produce or detect cytokinin. However, anecdotal reports have suggested that plants propagated in the same lot at the same facility can have very different rates and severities of TP after delivery to different nurseries. Potted plants are affected more severely than field-grown plants. In short, although the cause remains to be determined, TP could be caused by a combination of cultural, genetic, and environmental factors.

MANAGEMENT STRATEGIES:

Given that the causes are still unknown, post-propagation options for control of TP are limited. However, studies have indicated that conditions that induce rapid growth increase the incidence of TP. Limiting fertilizer rates and avoiding growth enhancers is suggested to reduce the risk of TP.

Because it is non-infectious, TP is not spread through pruning equipment or during bud pinching. However, plants showing any signs of TP should be avoided when selecting sources of new cuttings.

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