Apple Proliferation Phytoplasma *Candidatus Phytoplasma mali*

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The organism responsible for this disease of apples, stone fruits, and other perennial fruit trees is a phytoplasma: a very small bacterium lacking a cell wall and enclosed in a single membrane. Inhabiting primarily the phloem tissue of plants, it spreads from infected trees to healthy ones by tissue-feeding insects such as leafhoppers and psyllids. Of importance to the tree fruit industry, the disease can also spread via the use of infected plant material during propagation of scion wood and rootstocks used for grafting. Apple proliferation phytoplasma occurs in Europe and, if it spreads into North America, could have a significant negative impact on tree fruit production.

**Concern**

Apple proliferation phytoplasma represents one of the most economically important threats to apple production in Europe. Nearly all apple varieties grown in Europe are susceptible. Fruit losses up to 80% can occur in the first two years of infection. Trees may recover but fruit often remains undersized and phytoplasma harbored in roots may be spread to healthy trees. Commercial production in Europe has found rates of 18% per year of apple proliferation phytoplasma spread to healthy trees in an orchard. The estimated total value of crops that could be infected in the United States is $7.2 billion.

**Description**

Distinctive symptoms include the untimely development of axillary buds, which leads to a proliferation of lateral shoots called witches brooms. The disease causes stunting and infected trees generally lack vigor. Infected apple trees may show decreased trunk and crown growth.
diameter, thin shoots, and discolored and dead areas on the bark. Small, stunted fruit develops on infected trees reducing the amount and quality of the crop. Leaves fail to develop normally, roll downward, become brittle, may turn yellow in summer, and their stipules may grow larger.

**Damage**

Significant overall damage to apple trees occurs in poor growth and vigor reduction. Fruits have poor flavor, fail to color fully, and remain small—leading to decreased commercial value. Infected trees have increased susceptibility to powdery mildew and silver leaf, possibly due to altered sugar transport in phloem tissue. Premature death of trees can also result in severe cases.

**For More Information**


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Fruits of apple cv. Jonathan affected by apple proliferation of phytoplasma, showing marked reduction in fruit size; longer, thinner peduncles and shallower calyx end and peduncular cavities; healthy fruit on right.