CAES
The Connecticut Agricultural Experiment Station
Putting Science to Work for Society since 1875

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APPLE PROLIFERATION (*Candidatus* Phytoplasma mali)

Apple proliferation (AP) is a pathogen that causes disease primarily in apple and stone fruit such as cherry, apricot, and plum. It is established in Europe, Africa, and Asia, where it has caused serious damage to apple growing areas.

Most apple cultivars are susceptible to apple proliferation, though some cultivars are more tolerant than others. Apple trees affected by apple proliferation may lack vigor, with small trunks, shoots, and crown diameter. Bark may develop necrotic areas, have a reddish-brown color, and be fluted lengthwise. Additionally, AP may cause witches' brooms, small leaves with enlarged stipules, enlarged flowers with many petals, leaf reddening or chlorosis, autumnal growth of buds, and small or irregular shaped fruit. These symptoms can resemble those caused by other pathogens and environmental factors. Molecular analysis is needed to differentiate AP from other phytoplasmas.

Apple proliferation has not yet been found in the United States. Long distance spread may occur through the importation of infected plants or insects. Shipments of plant material from countries where AP is located may be a risk, such as Belgium, Czech Republic, France, Germany, Italy, and the Netherlands. AP can also spread from an infected tree to an uninfected tree through insect vectors.

Apple proliferation may be able to establish in plant hardiness zones 4-11. Orchards in the US with apple, cherry, apricot, and plum may be vulnerable to infection if the pathogen is introduced.

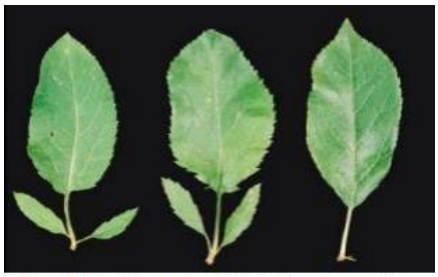

Figure 3. Healthy apple leaf (right) compared to '*Ca*. P. mali' infected leaves (left, middle showing enlarged stipules). Stipules resemble small leaflets at the base of the leaf. Image courtesy of Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für Pflanzenschutz im Obstbau Archive, www.bugwood.org.

Figure 4: Enlarged flower with numerous petals on apple tree infected with apple proliferation. Image courtesy of Loschi. DI4A, University of Udine, Italy. http://www.cabi.org/compendia/cpc/.

Figure 1. Witches' broom on apple due to '*Ca*. P. mali'. Image courtesy of Biologische Bundesanstalt für Land-und Forstwirtschaft, Institut für Pflanzenschutz im Obstbau Archive, www.bugwood.org.