Xanthomonas translucens pv. *pistaciae*

Fig. 1. Typical xylem staining (a) and dieback (b) associated with *X. translucens* pv. *pistaciae* infection in Pistachio; *X. translucens* pv. *pistaciae* on Sucrose Peptone Agar (c). Photo credits C. Taylor (a, b) and A. Salowi (c)

Disease: Pistachio Dieback
Classification: D: Bacteria, C: Gammaproteobacteria, O: Xanthomonadales, F: Xanthomonadaceae

Xanthomonas translucens pv. *pistaciae* is the causal agent of dieback of Pistachio (*Pistacia vera*, *Anacardiaceae*). The disease is endemic to Australia and is characterised by trunk and limb lesions, excessive resin exudates, discolouration of mature xylem (Fig. 1a), stunted growth and shoot dieback (Fig. 1b). Affected trees gradually decline, fail to produce marketable nuts and eventually die. The first outbreak of the disease occurred with the onset of commercial production in the mid-late 1990s, killing or rendering unproductive up to 10% of the trees. Another serious outbreak occurred recently in 2005.

The pathogen

X. translucens pv. *pistaciae* has recently been classified as a new pathovar of *X. translucens* on the basis of several biological, biochemical and molecular criteria, including its distinct pathogenicity to Pistachio. Two groups, A and B, biologically and genetically distinct, coexist in Australian orchards but only group A is widespread.

Host range

The only natural host identified is Pistachio, a dicotyledonous woody host. In this respect, *X. translucens* pv. *pistaciae* is unique among *X. translucens* pathovars, all pathogenic to monocot species in the *Poaceae*. *X. translucens* pv. *pistaciae* can also infect Poaceae, but only artificially, and it has never been found naturally in such hosts. It can also artificially infect several species of *Anacardiaceae*, unlike *X. translucens* pv. *translucens*.

Spread

X. translucens pv. *pistaciae* seems to be transmitted through pruning. No natural way of transmission has been demonstrated: inoculation through leaves, lenticels, or roots was successful only rarely and no vector has been found.

Detection

X. translucens pv. *pistaciae* produces typical yellow slimy colonies (Fig. 1c) that are useful for diagnostic purposes. Multiplex PCR and RT-PCR are also available that detect and distinguish the two groups of the Pistachio pathogen. These methods have been optimised for use with a wide range of infected material. RT-PCR is the more sensitive, allowing detection in asymptomatic trees.

Prevention and management

Hygiene practices are of paramount importance and growers are advised to disinfect pruning tools to limit the spread of the disease. Drastic pruning, where trees are cut back to secondary or tertiary branches, has shown some benefit in managing severely affected trees and restoring them to productivity. Biological control options are being investigated. Observations of unexplained slow down in disease spread and symptom expression after the two major outbreaks have led to the hypothesis that *X. translucens* pv. *pistaciae* needs biological and/or environmental trigger(s) to cause pistachio dieback. This needs further investigation to help develop efficient control strategies.

Further Reading

Facelli *et al*., Australasian Plant Pathology (in press); Giblot-Ducray *et al.,* Systematic and Applied Microbiology (in press); Marefat *et al*. (2006) European Journal of Plant Pathology **116**, 57-68; Marefat *et al*. (2006) Plant Pathology **55**, 639-649; Facelli *et al.* (2005) European Journal of Plant Pathology **112**, 155-165.

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