

Distribution, Biology and Management of Ceratocystis Wilt and its Threat to Kiwifruit Production

Executive summary of a literature review by;
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February 2015

Executive Summary

Ceratocystis wilt, caused by *Ceratocystis fimbriata* and relatives, is an emerging disease affecting a diversity of plant hosts worldwide. The pathogen was reported for the first time causing substantial mortality in commercial kiwifruit orchards in Rio Grande do Sul, the southernmost state in Brazil. In response, this review provides a perspective on the possibility of introduction of strains of *C. fimbriata* into new kiwifruit production areas, reviews the biology of Ceratocystis wilt, and outlines possible management tools should growers be confronted with the disease.

The most aggressive strains of the *C. fimbriata* complex are found in or originate from the Western Hemisphere, particularly in South America and the Caribbean. A wide diversity of crops is affected by the Latin American Clade (LAC) of the *C. fimbriata* complex, which includes the soilborne pathogens *C. fimbriata* on many hosts, *C. cacaofunesta* on cacao, *C. platani* on *Platanus* spp., and *C. colombiana* on citrus and coffee. Brazil appears to be a major source of exported strains of the pathogen, particularly strains of *C. fimbriata* that are common in *Eucalyptus* and mango there. However, numerous crop species are seriously affected, from Brazil to northern South America and the Caribbean, and strains have been dispersed worldwide.

Movement of American strains to new areas has been primarily in vegetatively propagated host material, often in experimental plantings. Strains of the LAC have been dispersed widely on sweet potato storage roots and corms of aroids such as taro. Strains have also been distributed in infected nursery stock and cuttings of *Eucalyptus*, mango, London plane, fig and cacao. Two recent major outbreak regions are of particular concern. One is in South China, where a population of closely-related *C. fimbriata* strains has been found on *Eucalyptus*, taro, and loquat, and these strains are causing substantial mortality of pomegranate in Yunnan and Sichuan. A second population is causing extensive mortality of mango in Oman and Pakistan, pomegranate in India, and *Acacia* in Indonesia. These populations of *C. fimbriata* have genetic characteristics of South American populations of *C. fimbriata*, but the threat of new introductions from Asia may be greater than the threat of new introductions from South America.

Unfortunately, the disease on kiwifruit in Brazil is caused by a variety of strains of *C. fimbriata* that were each virulent on three tested cultivars of kiwifruit. The most common strains appear to have originated from a nursery that may have had *C. fimbriata* established prior to kiwifruit production, but it is also possible that strains of the pathogen were brought in from Chile. Regardless, the fungus has spread and appears to be causing

extensive mortality. Like in other areas in Brazil, the fungus is established in the soil, and the pathogen may be spreading to adjacent plants through root grafts as well as on contaminated tools.

Management options for Ceratocystis wilt on other crops have included disposal of diseased plants, disinfection of tools, severing of root grafts, and selection and development of resistant cultivars. These practices have the potential to lessen losses in kiwifruit, too. However, the most important action is to prevent introduction of new strains of *C. fimbriata*. With the wide and unpredictable host range of the fungus, all imported plant material should be considered a potential pathway. Corms and slips of aroids, cuttings of woody plants, and nursery stock from the Americas, Asia and elsewhere should be carefully monitored to prevent introductions of aggressive genotypes of *C. fimbriata*.