

Objectives & Rationale

This study aimed to determine the phytosanitary status of stone fruit propagation material and nursery trees, in regards to canker and wood rot pathogens. The objectives included the identification of these pathogens and subsequently assessing their pathogen status.

Methods

Propagation material sampled included scion shoots (1 nectarine and 3 plum cultivars) and rootstock shoots (2 nectarine and 3 plum cultivars) from stone fruit mother trees and ungrafted, rooted rootstock plants (2 nectarine and 3 plum cultivars). The material included 3840 green buds and 2880 dormant buds, 600 dormant rootstock shoots and 378 ungrafted rooted rootstock plants investigated. In total 1080 stone fruit nursery trees of plum (three scion on three plum rootstock cultivars) and nectarine (one scion on two rootstock cultivars) were sampled from three nurseries. The material was surface sterilised and isolations made. Fungal cultures were identified on the basis of cultural growth, morphology, sequencing of relevant barcoding genes and phylogenetic analyses. Representative cultures of the fungal species identified were used in pathogenicity trials. Canker and wood rot fungi were wound-inoculated onto shoots of two plum cultivars (in orchards) and lesions assessed after 4 months. *Cylindrocarpon*-like fungi were wound inoculated onto detached rootstock shoots and evaluated after 7 weeks. The latter fungi were also inoculated onto tissue culture rootstock plants with colonized millet seed and evaluated for reduction root mass and root symptoms after 8 and 12 weeks.

Key Results

Buds used for oculation had low levels of infection, with 1.2% of dormant buds infected and 0.4% of green buds infected. The dormant rootstock shoots had infection with canker pathogens (6.2%) before it was planted in the nursery fields and increased as the ungrafted, rooted rootstock plants had 10.6% infection with canker and wood rot pathogens and 6.4% infection with *Cylindrocarpon*-like fungi. The certified nursery trees when cross-sectioned displayed brown discoloration in the pruning wound, bud union and often from the crown. Canker and wood rot associated fungi infected 21.8% of nursery trees and the *Cylindrocarpon*-like fungi infected 23.6% of nursery trees. The canker causing pathogens that were isolated the most were *Cadophora luteo-olivacea* and *Diplodia seriata*. Of the *Cylindrocarpon*-like fungi *Dactylonectria novozelandica* and *Dactylonectria torresensis* occurred the most.

The pathogenicity trials confirmed the pathogenic status of the canker and wood rot causing species. *Lasiodiplodia theobromae* was the most virulent species. All of *Cylindrocarpon*-like species formed lesions significantly longer than the negative control, indicating their potential as vascular pathogens on detached rootstock shoot trials. The most virulent species identified was *I. liriodendri*. Pathogenicity testing using peach rootstock tissue culture plants were inconclusive in regards to root weight loss and should be conducted over a longer time period.

Conclusion and Discussion / Recommendation

The results of this research show that nursery stone fruit trees and propagation material can harbor latent infections. Different management practices need to be evaluated to prevent these infections and ensure cleaner stone fruit nursery trees. Most of the infections were at the crown of the trees. This indicate that antifungal protection of the rootstock wound when pushed into the soil would help to prevent these crown infections. Various strategies need to investigate the production of cleaner bud material. Budding practices should take care to sterilise knives on a regular basis. Applying an effective antifungal pruning wound sealant on the rootstock wound would aid in lessening infections at this wound site.