Sept 20 Pathogen of the month – Sept 2020

Neofusicoccum spp. *Crous, Slippers & A.J.L. Phillips*

Fig. 1. (a) *Neofusicoccum luteum* with typical yellow pigment and mycelia growing out of grapevine tissues on artificial media; (b) grapevine cordon with dieback and canker; (c) cross-section of the wood with internal staining that originated from a wound infected by *Neofusicoccum* spp.; and (d) grapevine trunk treated with pruning wound dressing following remedial surgery.

Disease: Botryosphaeria dieback of grapevines; Blueberry stem dieback or stem canker

Classification: K: Fungi P: Ascomycota C: Dothideomycetes O: Botryosphaeriales F: Botryosphaeriaceae

Belonging to the Clade 6 of the Botryosphaeriaceae, *Neofusicoccum* species are endophytes and pathogens associated with woody plants worldwide. *Neofusicoccum australe*, *N. luteum* and *N. parvum* are three of the most important causal agents of Botryosphaeria dieback in grapevines and other horticultural crops. Recent studies have demonstrated that these species produce an array of phytotoxic metabolites.

Biology and Ecology:

Neofusicoccum species are members of the Botryosphaeriaceae family and are well known endophytes and latent pathogens of many woody plants. They produce hyaline thin-walled conidia that may become septate and translucent brown before germination. *N. luteum* and *N. australe* are easily distinguished from other Botryosphaeriaceae species by their yellow pigment in young cultures (Figure 1a) while *N. parvum mycelia* can vary from white or pale yellow. As the cultures of *N. australe*, *N. luteum*, and *N. parvum* mature, the pigment of mycelia change to grey. *N. parvum* and *N. luteum* were first reported as pathogens of kiwifruit (*Actinidia deliciosa*). They are considered as some of the most virulent species associated with Botryosphaeria dieback of grapevines worldwide. Their spores are dispersed by rain splash and wind that can infect grapevines primarily through pruning wounds, colonising the wood resulting in cankers and dieback (Fig 1b) and eventually killing the entire vine. The internal symptoms include wedge-shaped or central necrosis of the wood (Fig 1c). Disease development usually occurs internally, and external symptoms are only observed when the infections are severe, making management more difficult.

Impact:

*Neofusicoccu*m spp. are serious plant pathogens that cause cankers and dieback in many horticultural crops They are considered important pathogens causing trunk disease in grapevines. These infections will result in significant yield loss and increased production costs and are considered serious threats to vineyard sustainability.

Distribution:

These species are ubiquitous in nature and can be found in a broad range of hosts. They are distributed worldwide.

Host Range:

Association is mainly with woody plants such as grapevines, avocado, blueberry (*Vaccinium* spp.), olives, walnut, kiwifruit, pistachio, and *Eucalyptus* spp.

Management options:

These species are known to infect their hosts primarily through wounds, thus, wound protectants are considered the primary control in protecting the hosts from infection. In Australian vineyards, fungicide sprays are recommended within one week of pruning during winter to prevent or reduce infections. Vines with canker or dieback are also managed through remedial surgery (Fig 1d) by removing infected cordons and trunks and additional 10 cm of asymptomatic wood. Large wounds are then treated with paints or pastes with or without fungicides to prevent new infections. The water shoots are allowed to grow and trained to replace the lost canopy.

For other horticultural crops, management practices include quarantine inspections, plant certification of nurseries, selective pruning performed only by a trained pruning crew and the removal of cankers from trunks followed by an application of a fungicide and/or a wound dressing.

Further Reading: Baskarathevan J, et al. (2012) Fungal Biol; Billones-Baaijens R, Savocchia S (2018) Australas Plant Pathol https://doi.org/10.1007/s13313-018-0585-5; Crous et al., (2006) Stud Mycol. 55: 235–253; Lawrence et al (2017) Lopes et al. (2016) Mycosphere 7 (7): 906–920; Massi et al. (2020) : J. Nat. Prod. 83, 453−460; Moral et al (2019) https://doi.org/10.1016/j.cropro.2019.104927; Pillay et al (2013) South African J Bot 84: 38-43; Sakalidis et al., (2013) Diversity Distrib.19, 873–883; Pitt WM et al (2010) Aust J Grape Wine R 16, 258-271; Pitt WM et al (2012) Plant Dis 96, 1303-1308; Scarlett et al. (2019) Austral Plant Pathol 48:45–57; Slippers et al (2013) Stud Mycol. 76(1): 31–49; Slippers B, Wingfield MJ (2007) Fungal Biol Rev 21 90-106.; Úrbez-Torres JR (2011) Phytopathol Mediterr 50, S5–S45

Key Contacts: Dr Francine Perrine-Walker, email: marie.perrine-walker@sydney.edu.au
Dr. Regina Billones-Baaijens, email: rbaaijens@csu.edu.au