The Australian Wine Research Institute

Fact Sheet
VITICULTURE

Grapevine red blotch virus

Photo credit: Dr Keith Perry, Cornell University

Introduction

Grapevine red blotch virus (GRBV, genus *Grablovirus*, family *Geminiviridae*), formerly known as Grapevine red blotch-associated virus, was first discovered in 2008 in the Napa Valley, California. It has since been found in most grapegrowing regions of the USA, as well as Argentina, Canada, India, Mexico and South Korea (Cieniewicz et al. 2017).

More than 4,000 grapevine samples have been tested in Australia for GRBV since June 2014 and all have been negative. It is therefore considered an exotic virus for Australia.

The impact of the virus

In countries where it is established, GRBV, has been reported to cause significant economic losses in vineyards including lower yields and reduced quality in both wine-grapes and table grapes. Research shows the virus to cause delayed fruit maturity, lower sugar levels (by 1 to 4°Brix) and negative impacts on secondary metabolites associated with wine colour, flavour and aroma (Wallis and Sudarshana 2016, Blanco-Ulate et al. 2017, Martínez-Lüscher 2019).

The symptoms

Both red and white grapevine varieties are susceptible to GRBV, but the symptoms are more pronounced in red varieties. GRBV symptoms are similar to those that occur with leafroll diseases (e.g. reddening of the leaves). The key visual difference is that unlike leafroll viruses where the veins

remain green, with GRBV the red colour spreads through the primary and secondary veins (Figure 1). In white varieties, leaves show irregular chlorotic areas that become necrotic at the end of the season.

Figure 1. Symptoms of grapevine red blotch virus on Vitis vinifera cv Cabernet Franc grafted on 101-14. (Pictures from: Dr Mysore Sudarshana, Department of Plant Pathology, University of California, Davis)

Virus spread

An insect vector for GRBV, the three-cornered alfalfa hopper (*Spissistilus festinus)* (Figure 2), was identified in 2016 at UC Davis (Bahder et al. 2016) confirming suspicions that the virus was not being spread exclusively through infected plant material. The distribution of infected vines indicates that winged adult hoppers spread the virus by piercing vines arbitrarily. This contrasts with the spread of leafroll viruses and GVA-associated Shiraz Disease by mealybug or scale insects where the pattern of spread appears clustered.

Studies in the USA (Cieniewicz et al. 2019) showed that spread of GRBV was proportional to the population density of the vector in a vineyard, while the proportion of the initial virus infestation was irrelevant.

Management

There is no cure for GRBV so preventative measures need to be adopted. GRBV is known to be graft-transmissible, so the use of virus-tested planting material (negative for GRBV) in propagation is the first line of defence against this disease. The virus has not been found to be spread by vineyard machinery or pruning tools. It is only in the presence of the insect vector that newly infected plants are found (Cieniewicz et al. 2019). As such, it is critical to keep the vector out of Australia through stringent biosecurity protocols. Regular vineyard monitoring for virus-like symptoms and virus testing should be standard practice.

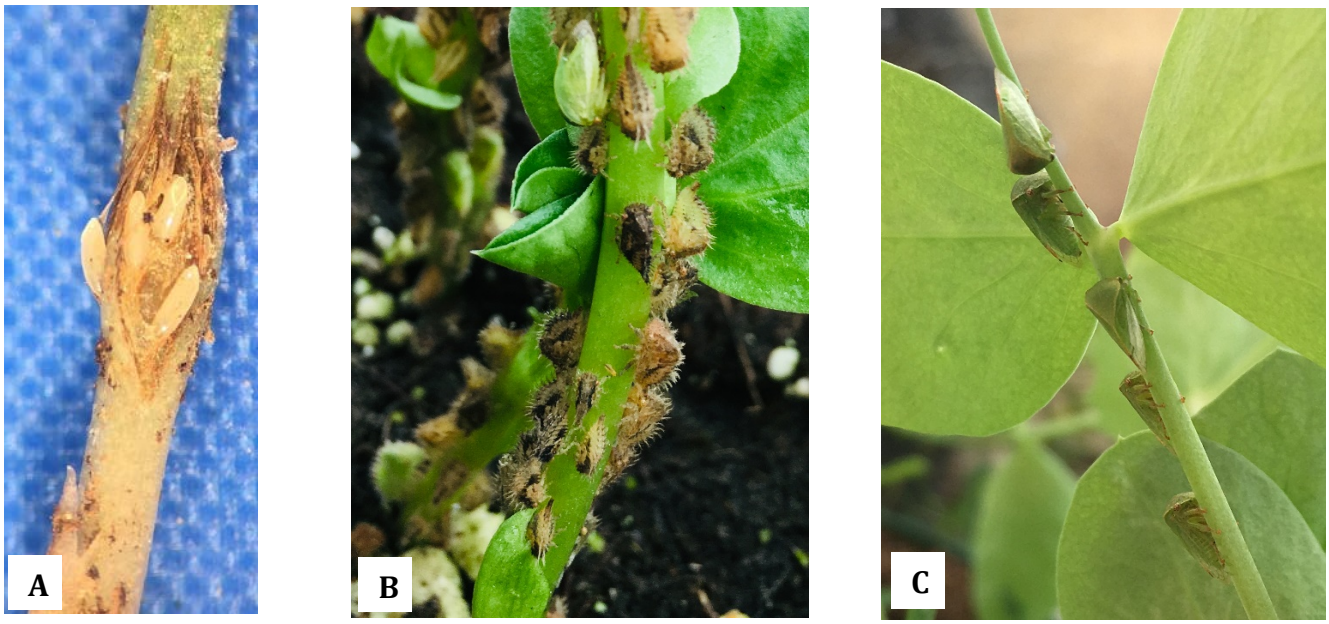

Figure 2. Three-cornered alfalfa hopper (TCAH), Spissistilus festinus*; A: eggs, B: nymphs and C: adults. (Pictures from Dr Cindy Kron, University of California, Santa Rosa)*

References and further reading

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