Raspberry Leaf Mottle Virus

a. Virus/pathogen name, including accepted acronyms and synonyms

Raspberry leaf mottle virus, RLMV- Genus *Closterovirus*, Family *Closteroviridae*

b. Host range, including resistance or tolerance within the crop hosts, alternate hosts

Raspberry leaf mottle virus is restricted to the genus *Rubus* including red, yellow and black raspberry and blackberry (McGavin and MacFarlane, 2010).

b. Symptoms on crop host including varietal differences with images of symptoms when available

Symptoms caused by RLMV can differ between genotypes. In blackberry symptoms may appear as faint chlorotic mottle, whereas on raspberry, symptoms appear on cultivars such as Malling Delight, Malling Landmark and St Walfried as apical necrosis, stunting and mottling. Yet some cultivars remain symptomless (McGavin and MacFarlane, 2010).

RLMV together with rubus yellow net virus (RYNV) and black raspberry necrosis virus (BRNV) cause raspberry mosaic disease (RMD) showing angular chlorotic spots over the leaf, sometimes accompanied by leaf twisting and crumpling (Murant; 1974; McGavin and MacFarlane, 2010)

c. Geographic distribution:

RLMV is spread in *Rubus* species throughout the Europe, and the virus has been reported in United Kingdom (Jones and McGavin, 1998) and North America (Oregon, Washington, British Columbia, Canada, Arkansas, North Carolina) (Quito-Avila, Lightle and Martin, 2014; Thekke-Veetil et al., 2017).

e. Means of spread:

RLMV is transmitted by the large raspberry aphid *Amphorophora agathonica,* in a semi-persistent manner (Quito-Avila, Lightle and Martin, 2014)

f. Recognized diagnostic tests with cited references:

The preferred detection method for the virus is reverse transcription polymerase chain reaction (RT-PCR) using both primer sets of the Tzanetakis et al. (2007) study.

g. Sampling recommendations for each pathogen including timing and tissue to be sampled

Sampling for virus testing could be done throughout the growing season, even a titer of the virus can slightly increase in late summer (Quito-Avila, Lightle and Martin, 2014). Samples should be taken from fully developed leaves. Sampling from different parts of the plant is advisable to minimize the possibility of false negatives due to virus irregular localization.

h. Management strategies for the pathogen and the vector(s) of the pathogen

Managment should be focused on monitoring and controlling the large raspberry aphid *A. agathonica*, to reduce virus incidence (Quito-Avila, Lightle and Martin, 2014).

i. References

1. Jones, A.T. and McGavin, W.J. (1998). Infectibility and sensitivity of UK raspberry, blackberry and hybrid berry cultivars to Rubus viruses. *Annals of Applied Biology*, 132(2), pp.239–251.
2. McGavin, W.J. and MacFarlane, S.A. (2010). Sequence similarities between Raspberry leaf mottle virus, Raspberry leaf spot virus and the closterovirus Raspberry mottle virus. *Annals of Applied Biology*, 156(3), pp.439–448.
3. Murant, A.F. (1974). Viruses affecting raspberry in Scotland. *Scott. Hortic. Res. Instit. Assoc. Bull*. 9, pp.37-43.
4. Quito-Avila, D.F., Lightle, D. and Martin, R.R. (2014). Effect ofRaspberry bushy dwarf virus, Raspberry leaf mottle virus, and Raspberry latent virus on Plant Growth and Fruit Crumbliness in 'Meeker' Red Raspberry. *Plant Disease*, 98(2), pp.176–183.
5. Thekke-Veetil, T., Khadgi, A., Johnson, D., Burrack, H., Sabanadzovic, S. and Tzanetakis, I.E. (2017). First Report of Raspberry leaf mottle virus in Blackberry in the United States. *Plant Disease*, 101(1), pp.265–265.
6. Tzanetakis, I.E., Halgren, A., Mosier, N. and Martin, R.R. (2007). Identification and characterization of Raspberry mottle virus, a novel member of the Closteroviridae. *Virus Research*, 127(1), pp.26–33.

Names of reviewers: Ioannis E. Tzanetakis

Date of last update: February 2020