Strawberry Mild Yellow Edge Virus

a. Virus/pathogen name, including accepted acronyms and synonyms
Strawberry mild yellow edge virus, SMYEV -- Genus *Potexvirus,* Family *Alphaflexiviridae* (ICTV)

b. Host range, including resistance or tolerance within the crop hosts, alternate hosts:
Fragaria spp. (many clones of *F. vesca* and *F. virginiana* are susceptible indicator plants) none are resistant. Single infections dare asymptomatic.

c. Symptoms on crop host including varietal differences with images of symptoms when available: Susceptible genotypes exhibit dwarfism, marginal chlorosis, leaf distortion and decreased fruit size. Tolerant genotypes are asymptomatic unless they are infected by a highly virulent strain or by more than one virus. Synergistic effects of mixed infections can lead to yield losses 28-63%. Cultivated varieties usually asymptomatic in single infection, however significant yield losses have been observed in cv. 'Camarosa'. Mosaic symptom were observed on new leaves of *Fragaria* x *ananassa* 'Seolhyang'. The symptomatic leaves later became distortion. On 'Eyeberry', black-colored leaf edges were observed. Mixed infections may cause severe symptoms including decline.

Geographic distribution: Worldwide, mainly where *Chaetosiphon* species, especially *C. fragaefolii are present.*

d. Means of spread:
Persistently transmitted by strawberry aphid, *Chaetosiphon fragaefolii*
Grafting
Clonal propagation of infected plants by runners

e. Recognized diagnostic tests with cited references:
Real-time PCR most sensitive and should be used in quarantine inspection of imported varieties, but it is more economical to use RT-PCR for virus-free seedling verification. (Wang et. al 2016, explained in abstract)
RT-PCR (Thompson and Jelkmann 2004) (Babini et al. 2004)
ELISA (commercially available)

f. Sampling recommendations for each pathogen including timing and tissue to be sampled:
Towards the end of crop cycle, coinciding with increase in mean temperatures, from youngest fully developed trifoliate during the flowering/fruiting stage.

g. Management strategies for the pathogen and the vector(s) of the pathogen: A frequently used method to control aphid populations involves the regular application of insecticides, however aphid management can be insufficient in preventing the spread of virus. Ensuring planting stock is clean from the virus is the best control method.

h. References

1. Babini, A.R., Cieślińska, M., Karešová, R., Thompson, J.R. and Cardoni, M. 2004. Occurrence and identification of strawberry viruses in five european countries. Acta Hortic. 656:39-43.
2. Barritt, B. H. and Loo, H. Y. S. 1973. Effects of mottle, crinkle, and mild yellow-edge viruses on growth and yield of Hood and Northwest strawberries. Can. J. Plant Sci. 53:605- 607.
3. Chang, L., Zhang, Z. , Yang, H. , Li, H. and Dai, H. 2007. Detection of Strawberry RNA and DNA Viruses by RT‐PCR Using Total Nucleic Acid as a Template. Journal of Phytopathology, 155:431-436.
4. Cho, J.-D., Choi, G.-S., Chung, B.-N., Kim, J.-S., and Choi, H.-S. 2011. Strawberry mild yellow edge potexvirus from Strawberry in Korea. Plant Pathol. J. 27(2):187-190.
5. Jelkmann, W., Maiss, E., and Martin, R.R. 1992. The nucleotide sequence and genome organization of strawberry mild yellow edge-associated potexvirus. J. Gen. Virol. 73:457-479.
6. Luciani, C., Celli, M., Torrico, A., Asinari, F., Pozzi, E., Peña Malavera, A., Kirschbaum, D., Perotto, M. and Conci, V. 2018. Incidence and prevalence of aphid‐borne viruses infecting strawberry in Argentina. Ann Appl Biol. 173:80-91.
7. Martin, L. W., and R. H. Converse. 1977. Influence of recent and chronic virus infections on strawberry growth and yield. Phytopathology 67: 573-575.
8. Thompson, J.R. and Jelkmann, W. 2004. Strain diversity and conserved genome elements in Strawberry mild yellow edge virus. Arch. Virol. 149:1897-1909.
9. Torrico, A. K., Celli, M. G., Cafrune, E. E., Kirschbaum, D. S., and Conci, V. C. 2016. Genetic variability and recombination analysis of the coat protein gene of Strawberry mild yellow edge virus. Australasian Plant Pathology 45:401–409.
10. Torrico, A.K., Salazar, S.M., Kirschbaum, D.S. et al. 2018. Yield losses of asymptomatic strawberry plants infected with Strawberry mild yellow edge virus. Eur J Plant Pathol. 150:983-990.
11. Wang, J.-H., Liu, J.-J., Chen K.-J., Li, H.-W., He, J., Guan, B., and He, L. 2016. Studies on Detection Techniques on *Strawberry mild yellow edge virus.* Southwest China Journal of Agricultural Sciences 29:2866-2870.
12. Yoshikawa, N. and Inouye, T. 1986. Purification, characterization and serology of strawberry pseudo mild yellow-edge virus. Ann. Phytopathol. Soc. Japan 52:643-652.

j. Names of reviewers: Ioannis E. Tzanetakis, Robert R. Martin,

k. Date of last update: April 2019