Strawberry Virus 3

a. Virus/Pathogen Name:
Strawberry virus 3 (StrV-3), Genus: *Deltanucleorhabdovirus*, Family *Rhabdoviridae*

b. Host Range:
StrV-3 was initially discovered in the strawberry 'F7' selection. It has been detected in F*ragaria vesca subsp. vesca* cv. 'Frost King' and in another Fragaria accession from the National Clonal Germplasm Repository (NCGR). No other host plants or alternative hosts have been identified for StrV-3.

c. Symptoms on Crop Host:
Specific symptoms associated with StrV-3 have not been detailed, and the virus was not transmitted to test plants using the strawberry aphid (*Chaetosiphon fragaefolii*). The presence of StrV-3 in plants often coincides with other viral infections, complicating the attribution of symptoms directly to StrV-3.

d. Geographic Distribution:
StrV-3 was discovered in the United States, specifically in a strawberry accession from the NCGR collection in Corvallis, Oregon. The original source plant for StrV-3, the 'F7' selection, originated from the Northeastern United States and Canada. There is also a report of the virus infecting strawberry in Iran.

e. Means of Spread:
Initial attempts to identify the strawberry aphid (*Chaetosiphon fragaefolii*) as a vector for StrV-3 were unsuccessful. It is unclear whether this virus has an aphid vector or if the virus has lost its ability to transmit after being clonally propagated for several years. Further studies are needed to identify the natural vector of StrV-3.

f. Recognized Diagnostic Tests:
Two detection methods have been developed for StrV-3:
- Triplex RT-PCR Assay: This assay amplifies specific fragments of the nucleocapsid (N) and replicase (L) genes, along with a host gene as an internal control.
- CRISPR-Cas Based Protocol: This protocol is highly sensitive and can detect the virus in as little as 1 femtogram (fg) of total RNA. It is particularly useful for detecting the virus in generation 1 (G1) strawberry plants.

g. Sampling Recommendations:
Samples should be taken from the youngest fully expanded leaves for StrV-3 detection. Both the triplex RT-PCR and CRISPR-Cas assays are recommended for routine surveillance, especially in G1 plants to ensure virus-free propagation material.

h. Management Strategies:
Management of StrV-3 relies on the use of virus-tested propagation material, particularly at the G1 level. The sensitive diagnostic protocols developed in this study will aid in the early detection

and prevention of StrV-3 in the strawberry industry. Since the virus has not yet been successfully transmitted by aphid vectors in laboratory settings, further research is necessary to identify natural vectors and to refine management strategies.

References:

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