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Data Sheets on Quarantine Pests

Strawberry crinkle cytorhabdovirus

IDENTITY

Name: Strawberry crinkle cytorhabdovirus
Synonyms: Strawberry latent virus, strains A and B
Strawberry lesion-A and lesion-B viruses
Strawberry vein chlorosis virus
Taxonomic position: Viruses: Rhabdoviridae: *Cytorhabdovirus*
Common names: SCrV (acronym) Strawberry crinkle (English)
Notes on taxonomy and nomenclature: While strawberry latent A and B viruses are forms of SCrV, strawberry latent C 'virus' is distinct and poorly characterized; it is a quarantine pest for EPPO (EPPO/CABI, 1996).
EPPO computer code: SYCXXX
EU Annex designation: II/A2

HOSTS

SCrV has a narrow natural host range among species of *Fragaria*. It occurs on the wild species *F. vesca*, *F. virginiana* and *F. chiloensis*, as well as on cultivated strawberries, *F. ananassa* (Sylvester *et al.*, 1976).

Experimental hosts artificially inoculated in recent reports include *Nicotiana glutinosa*, *N. clevelandii* (Sylvester *et al*., 1987), *N. occidentalis* (Van der Meer, 1989) and *Physalis floridana* (Hunter *et al*., 1990).

GEOGRAPHICAL DISTRIBUTION

SCrV occurs world-wide, wherever strawberry aphids of the genus *Chaetosiphon* are found on strawberry (Frazier *et al*., 1988). Its distribution thus probably covers more countries than are specifically listed below, including countries in Europe.
EPPO region: Belgium, Bulgaria, Czech Republic, France, Germany, Israel, Italy, Netherlands, Poland, UK, Yugoslavia.
Asia: China (Hebei, Hubei, Heilongjiang, Jilin, Jiangxi, Liaoning, Shandong, Shanxi, Zhejiang), Israel, Japan, Kazakhstan.
Africa: South Africa.
North America: Canada, USA (California, Oregon).
South America: Chile.
Oceania: Australia (New South Wales, Tasmania, Victoria), New Zealand.
EU: Present.

BIOLOGY

SCrV is transmitted in a persistent propagative manner by the principal natural aphid vector *Chaetosiphon fragaefolii*. Infectivity of aphids is retained lifelong. The length of a transmission cycle in nature depends on temperature conditions, since lower temperatures extend the incubation period in strawberry and the latent period in the vector. The virus

also multiplies in aphid species other than *C. fragaefolii* when injected (Frazier *et al*., 1988).

For more information, see Sylvester & Richardson (1986), Yoshikawa *et al*. (1986), Jelkmann *et al*. (1988), Adams & Barbara (1989), Bormans & Gilles (1989).

DETECTION AND IDENTIFICATION

Symptoms

Symptoms vary in relation to strain and strawberry cultivar (Krczal, 1988). Mild strains are symptomless in all cultivars ('strawberry latent virus'). Severe strains, in susceptible cultivars, cause distortion and crinkling of the leaves, with leaflets unequal in size and small irregularly shaped chlorotic spots, often associated with the veins.

Morphology

Under the electron microscope, virus particles in diseased plants are bacilliform, and typical of the rhabdovirus group (Richardson *et al*., 1972; Yoshikawa & Inouye, 1989). Identical particles have also been detected in aphids. The enveloped particles measure 69 ± 6 x 190-380 nm. Virus particles have been purified and structural proteins of disrupted virions characterized by polyacrylamide gel electrophoresis (Hunter *et al*., 1990). Single-stranded RNA has been isolated from purified particles and separated on agarose gels (Leone *et al*., 1991).

Detection and inspection methods

Biological detection of SCrV depends either on graft or aphid transmission to sensitive indicator plants. *F. vesca* cvs UC-4, UC-5, UC-6, and *F. vesca* var. *semperflorens* cv. Alpine are all very sensitive and show the diagnostic petal-streak and petiole lesion symptoms. Other symptoms are chlorotic to necrotic irregular spots on veins, epinasty, crinkling, distortion and uneven expansion of leaflets. Indicators of *F. virginiana* are cvs M1, UC-10, UC-11 and UC-12 (Frazier *et al*., 1988).

Recent advances in providing artificially inoculated experimental hosts have allowed the development of virus purification techniques (Hunter *et al*., 1990; Leone *et al*., 1991) but no antiserum useful for a reliable serologically based detection is yet available. Several researchers have identified rhabdovirus-like particles in thin sections of infected plant tissue by electron microscopy.

MEANS OF MOVEMENT AND DISPERSAL

Under natural conditions, SCrV is dispersed locally by the strawberry aphid *Chaetosiphon fragaefolii*. Movement also occurs with runners or with propagated material from tissue culture.

PEST SIGNIFICANCE

Economic impact

SCrV is one of the most damaging of the virus diseases affecting strawberries. Severe strains of SCrV reduce vigour and productivity and even mild strains, such as latent A, reduce vigour, runner production, yield and fruit size in some cultivars. When SCrV occurs in mixed infections in the field with other strawberry virus diseases such as mottle, vein banding, mild yellow edge, and/or pallidosis, disease outbreaks are more severe (Frazier *et al*., 1988).

Control

Propagation of virus-free plants and control of vectors are the essential measures (Krczal, 1988).

Phytosanitary risk

SCrV is not considered to be a quarantine pest by any regional plant protection organization. Since it is widespread in Europe wherever its vector occurs, it must be considered as a quality pest in Europe. It can very adequately be covered by a virus-free certification scheme, such as EPPO published (OEPP/EPPO, 1994) for strawberry.

PHYTOSANITARY MEASURES

Traded strawberry planting material should meet the conditions of a virus-free certification scheme. Diseased plant material should be eradicated. Healthy material tested free from SCrV can be obtained either by selection or by treatment. Apical meristems free from SCrV may occasionally be removed from infected plants and grown on culture medium, but the success of the method is greatly improved when parent plants are given a short heat treatment. Suggested temperatures eliminating the virus in several months are 38°C or temperatures fluctuating daily from 35 to 41°C (Frazier *et al*., 1988).

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