

Data Sheets on Quarantine Pests

Squash leaf curl bigeminivirus**IDENTITY****Name:** Squash leaf curl bigeminivirus**Synonyms:** Watermelon curly mottle virus
Melon leaf curl virus**Taxonomic position:** Viruses: Geminiviridae: Bigeminivirus**Common names:** SLCV (acronym)**EPPO computer code:** SQLCXX**EPPO A1 list:** No. 224**EU Annex designation:** I/A1**HOSTS**

The original strain of the virus (SLCV-CA) was reported in California (USA) damaging crops of *Cucurbita pepo* (marrows). The watermelon curly mottle strain (WCMoV) reported in Arizona (USA) has a wider host range, attacking also cucumbers (*Cucumis sativus*), melons (*Cucumis melo*) and watermelons (*Citrullus lanatus*). Other hosts include *Cucurbita foetidissima*, *C. maxima*, *C. moschata* and wild *Cucurbita* spp. SLCV is practically restricted to Cucurbitaceae, which are the only hosts on which it has any importance. However, certain Cucurbitaceae have been reported to be resistant in glasshouse and field tests (*Benincasa*, *Lagenaria*, *Luffa* spp.; McCreight & Kishaba, 1991). *Phaseolus vulgaris* is the only non-cucurbitaceous host reported for SLCV-CA, while the WCMoV strain has also been found to infect tobacco.

GEOGRAPHICAL DISTRIBUTION**EPPO region:** Absent.**Asia:** Philippines (doubtful record. Benigno (1977) refers to a *Bemisia*-transmitted leaf curl of squash, said to be seed-borne. This reference predates the description of SLCV in the USA and is unlikely to concern the same virus).**North America:** Mexico, USA (Arizona, California, Texas).**Central America and Caribbean:** Costa Rica, Dominican Republic, Guatemala, Honduras, Nicaragua.**EU:** Absent.**BIOLOGY**

The virus is transmitted in a persistent manner by *Bemisia tabaci*, especially biotype B. It is not transmitted by mechanical inoculation. Its acquisition and retention behaviour has been analysed by Cohen *et al.* (1989). At least two distinct strains of SLCV are known. The WCMoV strain, originally described as a distinct watermelon curly mottle virus in Arizona, has a wider host range than the type strain SLCV-CA in California (Brown & Nelson, 1989). Narrow host-range and broad host-range strains have also been described on the

basis of the molecular characterization of DNA components (Lazarowitz, 1987); it is not yet clear whether these coincide with the strains identified in the field (Brown, 1990).

DETECTION AND IDENTIFICATION

Symptoms

SLCV causes severe systemic stunting and leaf curl in cucurbits. The so-called silverleaf symptom is seen on cucurbits infested by *Bemisia tabaci* biotype B, but is not associated with SLCV. It has been suggested that it could be due to infection by another virus (Bharathan *et al.*, 1992), but it is now generally thought to be induced physiologically by the feeding of biotype B (hence its proposed name *B. argentifolii*).

Morphology

SLCV has geminate particles, 22 x 38 nm in size (Cohen *et al.*, 1983). The virus is associated with maturing phloem sieve tube elements (Hoefert, 1987).

Detection and inspection methods

SLCV is not mechanically transmissible. Recommended indicator plants are *Cucurbita maxima*, *C. moschata* or *C. pepo* (symptoms as above) or *Phaseolus vulgaris* (systemic green mosaic leaf symptoms and distortion). SLCV can be detected in *B. tabaci* by DNA spot hybridization assay (Polston *et al.*, 1990).

MEANS OF MOVEMENT AND DISPERSAL

SLCV moves only in its vector *Bemisia tabaci*, which can spread it between fields (and presumably glasshouses) in infested areas. In international trade, it is very unlikely to be carried by plants of its main cultivated hosts, since these are short-lived vegetable crops not normally moved except as seedlings. Young seedlings for transplanting might constitute a pathway, but would still be unlikely to be moved in intercontinental trade. The vegetables as such would not be likely to carry *B. tabaci*. So the main risk of movement is in *B. tabaci* on other host plants (e.g. ornamentals), given the fact that the vector moves readily from one host to another and that the virus can persist in the vector for several weeks after acquisition.

PEST SIGNIFICANCE

Economic impact

SLCV causes severe losses of squashes, melons and related cucurbits in Arizona and California (USA) (Duffus & Flock, 1982; Nameth *et al.*, 1985). Although recorded to infect *Phaseolus vulgaris*, there is no indication that it has any importance on that host (Brown, 1990). It was first observed in 1977/78 (Flock & Mayhew, 1981) and is one of a group of viruses which have become very important since the spread of biotype B of *Bemisia tabaci*.

Control

Control mainly aims at eliminating or excluding the vector *Bemisia tabaci*. Endosulfan and other insecticides have been used in an attempt to reduce whitefly density. It was found more effective to protect rows of seedlings with spun-bonded polyester as a floating cover (Natwick & Durazo, 1985). There are cultivars of *Cucurbita pepo* which are tolerant to SLCV (McCreight, 1984).

Phytosanitary risk

SLCV has recently been added to the EPPO A1 list, but has not been classified as a quarantine pest by any other regional plant protection organization. This is no doubt partly due to the fact that its appearance as a significant pest is very recent. It presents a severe threat to the cultivation of cucurbits (especially courgettes, melons and watermelons), in the open in southern Europe or under glass in northern Europe, wherever *B. tabaci* and especially its biotype B occur. It may be stressed that SLCV, like lettuce infectious yellows closterovirus (EPPO/CABI, 1996), has only been recorded in North America and that no other *B. tabaci*-transmitted virus is known to attack cucurbits in other parts of the world, except the little-known cucumber vein yellowing virus in the Middle East (Yilmaz *et al.*, 1989; Mansour & Al Musa, 1993).

PHYTOSANITARY MEASURES

Host plants of *Bemisia tabaci* from areas where SLCV occurs should come from a place of production free from SLCV and *Bemisia tabaci* (or treated against *B. tabaci*) during the last growing season. This applies especially to the ornamental *Euphorbia pulcherrima*, which is notorious for carrying *B. tabaci* inconspicuously.

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