

Data Sheets on Quarantine Pests

Blueberry leaf mottle nepovirus**IDENTITY**

Name: Blueberry leaf mottle nepovirus

Synonyms: Grapevine Bulgarian latent nepovirus

Taxonomic position: Viruses: *Nepovirus*

Common names: BLMV (acronym)

Notes on taxonomy and nomenclature: Many authors (e.g. Brunt *et al.*, 1996) consider grapevine Bulgarian latent nepovirus to be a distinct virus, but it is treated as a strain of BLMV in this data sheet. Since the EU Directive considers BLMV as an example of its category 'viruses and virus-like organisms' of *Vitis*, and not of *Vaccinium*, it is clear that grapevine-infecting strains have to be considered in this data sheet.

EPP0 computer code: BLLMOX

EPP0 A2 list: No. 198

EU Annex designation: I/A1

HOSTS

The principal woody host is highbush blueberry (*Vaccinium corymbosum*). Lowbush types (*V. angustifolium* and *V. myrtilloides*), and the highbush x lowbush hybrid (*V. corymbosum* x *V. angustifolium*) have been found to be symptomlessly infected in the wild in Michigan, USA, adjacent to commercial highbush plantings (Sandoval Briones, 1992). Also, some breeding accessions of hybrid blueberry (from Minnesota and Maine, USA) were found infected with BLMV in New Brunswick, Canada (Jaswal, 1990). A serologically distinct strain (also known as grapevine Bulgarian latent nepovirus) symptomlessly infects grapevines (*Vitis vinifera*) near Pleven and in other parts of Bulgaria (Martelli *et al.*, 1977, 1978), and another grapevine strain occurs in Portugal (Sequeira & Mendonça, 1992).

The NY strain of BLMV was found to infect one American grapevine (*Vitis labrusca*) in New York, USA (Uyemoto *et al.*, 1977).

GEOGRAPHICAL DISTRIBUTION

EPP0 region: Bulgaria, Hungary, Portugal.

North America: Canada (New Brunswick), USA (Michigan and in one case New York).

EU: Present.

BIOLOGY

BLMV infects blueberries via infected pollen, spread by honeybees. Although BLMV is a nepovirus (based upon physical and chemical properties), it does not appear to have a nematode vector. The virus causes an economically important disease in the highbush blueberry cultivars Jersey and Rubel. There is an approximate 4-year latent period between initial infection and the onset of symptoms. BLMV is seedborne in up to 20% of mechanically inoculated *Chenopodium quinoa*. The virus is also seedborne in 1.5% of

blueberry seedlings from an infected bush (Childress & Ramsdell, 1986a) and in 5% of *Vitis labrusca* seedlings (BLMV-NY strain) (Uyemoto *et al.*, 1977).

In grapevines, it is not known how the virus is spread. No nematode vector has been associated with the grapevine Bulgarian latent strain or the BLMV-NY strain (Childress & Ramsdell, 1986b).

DETECTION AND IDENTIFICATION

Symptoms

On highbush blueberry cv. Rubel, the main uprights of the bush are killed; new regrowth occurs from the crown. Leaves are malformed and mottled. If a leaf is held up to the light, translucent spots will show up. On cv. Jersey, bushes are stunted, but the main uprights are not killed back as with cv. Rubel. New growth exhibits rosetted leaves, which is a result of shortened internodes with leaves appearing to be piled on top of one another. Leaves on infected bushes are smaller than normal and are a pale yellow-green in colour. Crop yields are reduced to nil (Ramsdell & Stace-Smith, 1979). The grapevine Bulgarian latent strain does not cause symptoms on *Vitis vinifera*, hence its name. BLMV-NY strain causes leaf malformation and shortening of internodes in *Vitis labrusca*.

Morphology

BLMV virions are polyhedral and 28-30 nm in diameter when negatively stained with 2% uranyl acetate or 2% ammonium molybdate and viewed with a transmission electron microscope (Ramsdell & Stace-Smith, 1981). A full description of the virus and its properties is given by Ramsdell & Stace-Smith (1983).

Detection and inspection methods

BLMV can be detected directly from young, infected leaves of blueberry or grape, by use of ELISA. Alternatively, young symptomatic leaves can be ground in 5 ml 0.05M phosphate buffer, pH 7.2, containing 1% (v/v) nicotine alkaloid, followed by mechanical inoculation to leaves of *Chenopodium quinoa* or *Nicotiana clevelandii*. After 7-14 days, chlorotic lesions will develop on inoculated leaves of *C. quinoa* along with terminal epinasty of the growing tip. *N. clevelandii* will exhibit pin-point necrotic local lesions on the non-inoculated terminal leaves. Confirmation of infection by BLMV can be done by ELISA or by gel double diffusion tests in Ouchterlony plates, using antiserum to BLMV at dilutions of 1/4, 1/8, 1/16, 1/32 and 1/64. Healthy herbaceous sap controls should be employed in wells adjacent to the wells containing infected herbaceous host sap.

Other diagnostic herbaceous hosts which become symptomatic 7-10 days after mechanical inoculation with the virus are *Chenopodium amaranticolor* and *Nicotiana tabacum* cv. Xanthi.

MEANS OF MOVEMENT AND DISPERSAL

BLMV is present on the surface of and inside pollen grains from infected blueberry bushes. Honeybees spread infected pollen from bush to bush, causing infection. Bees marked at the hive entrance with coloured dye have been shown to forage to blueberry bushes 1600 m away. Also, marked honeybees have been shown to visit other hives in the same apiary and hives in apiaries 600 m away. Honeybees were also shown to spread pollen from bee to bee within hives. BLMV-infected pollen was shown to survive in hives and to remain infectious for up to 10 days (Childress & Ramsdell, 1987; Boylan-Pett *et al.*, 1991; 1992).

Wild highbush, lowbush and highbush-lowbush hybrids have been found to be infected with BLMV at distances of 5, 50 and 100 m into wooded areas adjacent to commercial

plantings of highbush blueberry that contained infected bushes. The means of spread of the virus in grapevine is unknown (Hancock *et al.*, 1993).

PEST SIGNIFICANCE

Economic impact

In Michigan commercial highbush blueberry plantings, BLMV causes virtually 100% crop loss within 4-5 years after infection. Within 10 years, the virus will kill blueberry cv. Rubel. Infected blueberry cv. Jersey does not usually die, but growers remove diseased bushes when symptoms are evident.

Control

Prevention is the best means of control. Only plant material from approved virus-tested programmes should be planted. If disease is already present in a planting, all infected plants should be identified by ELISA tests and destroyed. If plants are only cut off and allowed to regrow, blossoms will form which will bear infected pollen and be an inoculum source for healthy blueberry plants. Beehives should be placed as far away as possible from any diseased wild or cultivated bushes.

Phytosanitary risk

BLMV has recently been added to the A2 quarantine list of EPPO but is not listed by any other regional plant protection organization. It is extremely dangerous to *Vaccinium* spp., which are currently increasing in importance in the EPPO region. The strain which occurs in Europe (in Bulgaria), and also the NY strain known from one plant in North America, attacks grapevine. It is doubtful whether either of these strains has sufficient importance to be classed as a quarantine pest for grapevine; they can most easily be covered by normal certification of planting material, according to a scheme such as that recommended by EPPO (OEPP/EPPO, 1994). These strains are not known to attack blueberry.

PHYTOSANITARY MEASURES

Plants for planting of *Vaccinium corymbosum*, *V. angustifolium* and their hybrids, and of *V. myrtilloides*, should originate from an approved certification scheme for virus-tested planting material.

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