

Report of a Pest Risk Analysis

This summary presents the main features of a pest risk analysis which has been conducted on the pest, according to EPPO Decision support scheme for quarantine pests.

Pest: *Blueberry Scorch Virus* (BBScV)
PRA area: EPPO member countries
Assessor: PRA prepared by the Dutch NPPO (January 2005) and reviewed by the Panel on Phytosanitary Measures (March 2007).
Date: 2007-05-21

STAGE 1: INITIATION

Reason for doing PRA: In 2004 an outbreak of BBScV was found in a *Vaccinium corymbosum* crop in Piedmont (Italy). Few other outbreaks were found during the surveys in 2005 in the same area. In 2001 and 2003 two *Vaccinium corymbosum* samples with BBScV-like symptoms were sent to the Dutch NPPO. The presence of BBScV in the samples was confirmed in 2003, once reliable tests were developed. However, the origin of the samples is unknown. The pest was not detected during surveys conducted in The Netherlands in 2004 and 2005.

Taxonomic position of pest: *Virus Carlavirus*
Two strains are known and are considered together in the PRA.

STAGE 2: PEST RISK ASSESSMENT

Probability of introduction

Entry

Geographical distribution: EPPO region: Italy (2004).
North America: USA, Canada.

Major host plants or habitats: BBScV is mainly reported in highbush blueberry (*Vaccinium corymbosum*) in the United States and Canada (McDonald *et al*, 1990; Bristow *et al*, 2000; Caruso, 2003). In June 2003, BBScV was detected for the first time in, *Vaccinium macrocarpon* L. (cranberry). However, at this stage BBScV seems to cause no symptoms in cranberry plants (Wegener *et al*, 2004; Catlin and Schloemann, 2004). According to Catlin and Schloemann (2004), samples of rabbiteye blueberry (*V. ashei*) have tested positive for BBScV, but it is unclear if these plants exhibited scorch symptoms in the field. *Chenopodium quinoa* proved to be a susceptible host plant under lab conditions (ICTV, 2002). Another experimental host recently described is *Nicotiana occidentalis* (Lowery *et al* 2005)

Which pathway(s) is the pest likely to be introduced on:

Pathways are plants for planting (*in vitro* and *in vivo* produced propagation material). This type of material is imported in particular from the USA (although quantities imported are low).

Although blueberry fruit might become infected, it is not known to cause spread of BBScV. This pathway has not been considered.

Establishment

Plants or habitats at risk in the PRA area:

Vaccinium corymbosum and *Vaccinium macrocarpon*.

Blueberry producing EPPO countries are Austria (120 growers), Belgium (50 ha), Czech Republic, France (200 ha), Germany (600 ha), Italy (250 ha), Lithuania (700 ha), the Netherlands (300 ha), Poland (710 ha), Romania (700 ha), Slovenia (50 ha), Spain (a few plantations), Sweden (200 ha), United Kingdom (a few plantations), Ukraine (1500 ha) (FAOSTAT data, 2004 and 2005; TIS, 2004; Pliszka, 1997).

Blueberries and Cranberries are present in the wild in many parts of the EPPO region.

Climatic similarity of present distribution with PRA area (or parts thereof):

Average temperatures in parts of the area of origin are quite similar with temperatures in parts of the PRA region (appendix 1) but more information is needed on the suitability of climate in the northern and far eastern part of the EPPO region.

Aspects of the pest's biology that would favour establishment:

There is often a latent period of up to two years before the expression of symptoms (Bristow *et al*, 2000). Moreover, several tolerant cultivars have been identified. If the virus is present in these tolerant cultivars, they will remain symptomless but can act as an inoculum source (Martin and Bristow, 1988; 1995). These aspects make it possible for relatively low population levels of BBScV to become established.

The pest is transmitted by aphids. The main vector is *Fimbriaphis fimbriata* (*Ericaphis fimbriata*). *F. fimbriata* is also present in the PRA region. *Myzus persicae* is also a vector and is present throughout the EPPO region.

Characteristics (other than climatic) of the PRA area that would favour establishment:

It is not known if wild plants or weeds could play a role in dispersing and maintaining BBScV.

Which part of the PRA area is the endangered area:

All EPPO member countries is considered at risk.

POTENTIAL ECONOMIC CONSEQUENCES

How much economic impact does the pest have in its present distribution:

Bristow *et al* (2000) carried out a field study over a period of three years to compare the yield of healthy blueberry plants (*V. corymbosum*) with diseased plants. The study was carried out with healthy field bushes and adjacent bushes exhibiting symptoms of Blueberry Scorch Disease. The plants were of the (sensitive) cultivar 'Pemberton'. All ripe berries were always harvested on three dates (16 July and 8 and 25 August). Total yields of healthy bushes were compared with bushes that showed symptoms for

one, two and three years. Compared to healthy bushes, bushes showing symptoms for the first, second and third year carried respectively 31%, 72% and 83% less fruit. In another study by Bristow *et al*, six cultivars (out of 59 tested) showed no symptoms and no significant reduction in yield, 30 cultivars showed dieback of twigs and blighted leaves and flowers.

Besides the 3-year experiment carried out by Bristow *et al* no quantitative data is available on the economic impact of a BBScV infestation in the current area of distribution. However, the experimental results and qualitative data indicate that BBScV causes a serious economic impact due to premature death of plants and loss of yield. It is considered as an important disease of blueberry and has been included in the Certification scheme (testing being required).

In Piedmont (Italy), economical damages (plants dead or reduced production) have been observed, varying according to the cultivar (Gotta P., personal communication).

Describe damage to potential hosts in PRA area:

Symptoms caused by BBScV have been extensively reported. These symptoms range from complete necrosis of flowers and young leaves and twig dieback in some sensitive cultivars to no visible damage in tolerant cultivars. Severely blighted bushes bare little fruit. Twig dieback causes lateral buds below the point of necrosis to grow and produce branches later in season. Over a period of several years, infected bushes become very twiggy and the fruit load is markedly reduced compared to healthy plants (BC MAFF, 2001 and 2002; Bristow *et al*, 2000; Catlin and Schloemann, 2004; French *et al*, 2003; Hudgins, 2001; MacDonald and Martin, 1990; Martin and Bristow, 1988, 1995; Martin *et al*, 1992; Michigan, 2003; Wegener *et al*, 2004). The productivity of diseased plants that show symptoms declines each year and plants of some cultivars eventually die (Bristow *et al*, 2000). The severity of the symptoms can also vary from year to year (Catlin and Schloemann, 2004).

How much economic impact would the pest have in the PRA area:

Climatic and growing conditions in most EPPO countries are believed to be no limiting factors for BBScV. Therefore, it is estimated that damage levels can be comparable to the damage levels in Canada and the USA. Considering a similar impact of the virus, the producer profits might be reduced significantly.

Besides yield reduction, producer costs might rise as a result of the increased application of insecticides (if available) for aphid management and the removal and replacement of infected bushes. Since visual detection of the virus is not always possible, testing methods and certification schemes are potential additional costs as well.

The presence of the virus should not have an effect on export markets of blueberry fruit. However, the export of blueberry propagation material might be affected.

CONCLUSIONS OF PEST RISK ASSESSMENT

Summarize the major factors

BBScV is capable of causing significant damage to blueberry

that influence the acceptability of the risk from this pest:	crops, a crop that is becoming increasingly important in European countries. Therefore, the potential risk of BBScV should not be accepted at this moment.
Estimate the probability of entry:	Blueberry scorch virus (BBScV) might be able to enter the EPPO countries on imported nursery-stock from infested areas in the USA and Canada. However, the risk of entry is very low: there are no known import interception records, the volume of imported nursery-stock is small and testing of propagation material is recommended in Canada and the US. In vitro plants present a lower risk than <i>in vivo</i> plants. Probability of entry is low
Estimate the probability of establishment:	After entry in EPPO countries, BBScV is likely to be able to establish and survive. It is already present in Italy since 2004. Moreover, imported, infected nursery-stock acts as a direct source of infection because these will be planted on blueberry (production) fields. Aphids may spread the virus on a local scale (a few kilometres). The most important vector species is probably <i>Fimbriaphis fimbriata</i> (<i>Ericaphis fimbriata</i>), but also <i>Myzus persicae</i> is capable of spreading the virus both present in the region. Probability of establishment is high
Estimate the potential economic impact:	Qualitative data indicates that blueberry scorch is a serious disease; its symptoms range from complete necrosis of flowers and young leaves and twig dieback in some sensitive cultivars to no visible damage in tolerant cultivars. Potential of economic damage is considered medium to high
Degree of uncertainty	Main areas of uncertainty are <ul style="list-style-type: none"> • Geographical distribution in the EPPO region (two samples were tested positive in the Netherlands, but no infection detected during surveys conducted in 2004). • Capacity of other <i>Vaccinium</i> to become infected
OVERALL CONCLUSIONS	The risk is unacceptable and management measures should be considered.

STAGE 3: PEST RISK MANAGEMENT

IDENTIFICATION OF THE PATHWAYS

Pathways studied in the pest risk management	Plants for planting of <i>Vaccinium corymbosum</i> , <i>Vaccinium macrocarpon</i> L. and <i>Vaccinium ashei</i> .
Other pathways identified but not studied	none

IDENTIFICATION OF POSSIBLE MEASURES

Possible measures for pathways

Measures related to consignments:

- Plants for planting of *Vaccinium corymbosum*, *Vaccinium macrocarpon* L. and *Vaccinium asheiv* should be officially tested for BBScV.
- Plants for planting of *Vaccinium corymbosum*, *Vaccinium macrocarpon* L. and *Vaccinium*

ashei. should be produced in a certification scheme (official scheme for the production of healthy plants for planting which includes official and regular testing and inspection for BBScV).

Measures related to the crop or to places of production:

- As the vectors of BBScV have a medium capacity of natural spread, plants for planting of *Vaccinium corymbosum*, *Vaccinium macrocarpon* L. and *Vaccinium ashei* should originate from a pest free place of production (ISPM 10). Official annual surveys based on inspections and testing should confirm pest freedom to maintain the pathogen-free status.
- Plants for planting of *Vaccinium corymbosum*, *Vaccinium macrocarpon* L. and *Vaccinium ashei* should originate from a pest free area (ISPM 4) (with official annual surveys based on inspections and testing to confirm pest freedom to maintain the pathogen-free status).
- Plants for planting of *Vaccinium corymbosum*, *Vaccinium macrocarpon* L. and *Vaccinium ashei* should be grown in an insect-proof greenhouse or screenhouse and originate from mother plants that have been tested and found free of blueberry scorch virus.

Other possible measures

None eradication would be very difficult to achieve.

EVALUATION OF THE MEASURES IDENTIFIED IN RELATION TO THE RISKS PRESENTED BY THE PATHWAYS

Degree of uncertainty low

CONCLUSION:

Recommendation for possible measures (type presentation):

<p>Plants for planting of <i>Vaccinium corymbosum</i>, <i>Vaccinium macrocarpon</i> L. and <i>Vaccinium ashei</i> originating in countries where <i>Blueberry scorch virus</i> occurs</p>	<p>PC and, if appropriate, RC</p> <ul style="list-style-type: none"> • Plants for planting of <i>Vaccinium corymbosum</i>, <i>Vaccinium macrocarpon</i> L. and <i>Vaccinium asheiv</i> should be officially tested for BBScV. <p>or</p> <ul style="list-style-type: none"> • Plants for planting of <i>Vaccinium corymbosum</i>, <i>Vaccinium macrocarpon</i> L. and <i>Vaccinium ashei</i>. should be produced in a certification scheme. <p>or</p> <ul style="list-style-type: none"> • Plants for planting of <i>Vaccinium corymbosum</i>, <i>Vaccinium macrocarpon</i> L. and <i>Vaccinium ashei</i> should originate from a pest free place of production for <i>Blueberry scorch virus</i> <p>or</p> <ul style="list-style-type: none"> • Plants for planting of <i>Vaccinium corymbosum</i>, <i>Vaccinium macrocarpon</i> L. and <i>Vaccinium ashei</i> should originate from a pest free area for <i>Blueberry scorch virus</i>. <p>or</p> <ul style="list-style-type: none"> • Plants for planting of <i>Vaccinium corymbosum</i>, <i>Vaccinium macrocarpon</i> L. and <i>Vaccinium ashei</i> should be grown in an insect-proof greenhouse or screenhouse and originate from mother plants that have been tested and found free of <i>blueberry scorch virus</i>.
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