



Canadian Food
Inspection Agency

Agence canadienne
d'inspection des aliments

Pest categorization

Sphaerulina vaccinii Ali, Hildebrand & Abbasi

Sphaerulina leaf spot and stem canker



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Background

The purpose of this categorization is to determine whether *Sphaerulina vaccinii* (Sphaerulina leaf spot and stem canker) has the potential to satisfy the criteria in the definition for a quarantine pest. The method used by the CFIA to initiate and conduct this categorization is consistent with international guidelines set by the International Plant Protection Convention (IPPC). Definitions follow those listed in the IPPC's *Glossary of phytosanitary terms*.

Initiation point(s): This categorization was identified via a Commodity Risk Assessment on blueberry plants from Canada to the UK for the Jens-Georg Unger Plant Health Fellowship project, funded by the European and Mediterranean Plant Protection Organisation (EPPO). This project was led by a visiting scientist from the UK Department for the Environment, Food and Rural Affairs, utilising the tools and templates of the Canadian Food Inspection Agency and coordinating with experienced Canadian risk assessors.

Identification of the PRA area: The PRA area is all of the UK.

Current regulatory status: *Sphaerulina vaccinii* is not currently regulated as a pest in the UK or by any member country of EPPO (EPPO 2022).

Identity of organism

Name: *Sphaerulina vaccinii* Ali, Hildebrand & Abbasi (Mycosphaerellaceae)

Synonyms: N/A

English common names: Sphaerulina leaf spot and stem canker

French common names: N/A

1. Is the organism clearly a single taxonomic entity and can it be adequately distinguished from other entities of the same rank?

Yes
If no

Go to 2
Go to 11

This pathogen is identified from other *Sphaerulina* species by the morphology of its ascospores and conidia, and by the sequence analysis of certain genes (the internal transcribed spacer, translation elongation factor 1 alpha, RNA polymerase II second largest subunit, 28S nuclear ribosomal DNA gene, and β -tubulin genes) (Ali *et al.* 2021).

Symptoms include small water-soaked spots initially appearing on the underside of leaves. Over time, irregular, red-brown spots appear on the upper surface and causes leaf and fruit drop. Red-purple spots also develop on stems a year later that then enlarge and turn brown (Abbasi *et al.* 2022; Ali *et al.* 2021).

Sphaerulina vaccinii was very recently identified in 2021 though the disease has been reported in the literature from at least the 1980s as a *Septoria* species (Ali *et al.* 2021; Ginns 1986; Hildebrand and Nickerson 1989; Kinsman 1993). It is assumed in this categorisation that any study that describes a *Septoria* sp. infecting lowbush blueberry (*Vaccinium angustifolium*) and velvet-leaved blueberry (*V. myrtilloides*) is in fact based on *Sphaerulina vaccinii*. Another *Septoria* species, *S. albopunctata*, causes leaf spot symptoms on blueberry, however it is not reported to occur on lowbush blueberry (Ali *et al.* 2021; Percival and Dawson 2008).

Presence in the PRA area

2. Does the organism occur in the PRA area?

If yes Go to 3
No **Go to 5**

3. Is the organism widely distributed in the PRA area?

If yes Go to 11
If no Go to 4

Regulatory status

4. Is the organism under official control in the PRA area or is it a potential candidate for official control?

If yes Go to 5
If no Go to 11

Potential for establishment and spread in the PRA area

5. Does the PRA area have climatic conditions suitable for establishment and spread of the organism?

Yes **Go to 6**
If no Go to 11

6. Does the PRA area have ecological conditions suitable for establishment and spread of the organism?

Yes **Go to 7**
If no Go to 11

This fungus has been identified in parts of Canada (Quebec, New Brunswick, Nova Scotia and Prince Edward Island) and the United States (Maine) (Ali *et al.* 2021; PMC 2020). Unfortunately, it is not known how or when it became established in these regions. A *Septoria* species on blueberry is recorded in Canadian disease surveys from as early as 1967 (Creelman 1967). It is possible that this species was actually *Sphaerulina vaccinii* however, as the species of blueberry was unidentified, this remains uncertain. The first record of a *Septoria* species on lowbush blueberry was in 2010 (CPDS 2011), therefore we can assume *Sphaerulina vaccinii* has been present in Canada for at least a decade, potentially much longer. Nevertheless, the full native range of *S. vaccinii* remains uncertain, given its past identification as a “*Septoria* sp.”. In 2016, *Septoria* sp. was recorded on *Vaccinium* material in the UK (Defra 2022), therefore it is possible that *Sphaerulina vaccinii* is already present in the UK.

Sphaerulina vaccinii attacks lowbush blueberry (*Vaccinium angustifolium*) and velvet-leaved blueberry (*V. myrtilloides*) (Ali *et al.* 2021). These *Vaccinium* species are present in urban areas (e.g. gardens) in the UK and/or in cultivated areas such as fields, nurseries, and garden centres, that could enable the establishment and spread of this fungus (GBIF 2021; RHS 2022).

Our understanding of the epidemiology of this disease is quite limited (Ali *et al.* 2021). However, studies have shown that primary inoculum originates from pycnidia on overwintered leaves and cankers on fruiting stems (Ali *et al.* 2021). Conidia are then splashed by rain onto leaf surfaces. Infection of these blueberry species is also aided by a high, constant humidity and moderately high temperature of 20-25°C (Abbasi *et al.* 2022; Ali *et al.* 2021). It is possible that these conditions could be met in the summer of southern UK given the higher temperatures and humidity, the latter boosted by the combination of rainfall and a dense canopy of blueberry leaves (Abbasi *et al.* 2022; MetOffice 2022).

7. Is the organism a known pest in its area of current distribution?

Yes

If no

Go to 9

Go to 8

8. Does the organism have intrinsic attributes that indicate that it could cause significant harm to plants?

If yes

If no

Go to 9

Go to 11

9. With specific reference to the plants or habitats which occur in the PRA area, could the organism by itself, or acting as a vector, cause significant damage or loss to plants leading to negative economic, environmental, societal or export market impacts?

Yes
If no

Go to 10
Go to 11

Symptoms of this disease have become an increasing concern to Canadian growers in recent years. Symptoms include premature leaf drop and stem lesions which then affect the yield of blueberry plants (Hildebrand *et al.* 2010; Kinsman 1993). The pathogen (still classified as a *Septoria* sp. in this study) has been shown to cause a reduction in photosynthetic efficiency, and combined with leaf drop, results in a reduced floral bud number and yield (Scherm and Krewer 2008). Defoliation caused by this disease has been shown to reduce yield by at least 16%, though the impact of stem cankers on yield is still unknown (Ali *et al.* 2021). There is no record of *S. vaccinii* expanding its range though this could be attributed to the past taxonomic confusion around this fungus.

Blueberry species, such as *Vaccinium angustifolium*, are cultivated in the UK and are at risk of this pathogen. The value of the GB blueberry-growing economy is currently valued at £32 million ex-farm (Jack Evans, British Summer Fruits, pers. comm., Jun. 10, 2022). Blueberry plants are also grown as ornamental plants in gardens (RHS 2022). Finally, native *Vaccinium* species, such as *V. vitis-idaea* and *V. myrtillus* in the wild, could also be affected by this fungus though their host status is unknown. These native species are already under pressure from pathogens like *Phytophthora ramorum*.

Conclusion

10. This organism has the potential to satisfy the definition of a quarantine pest.

11. This organism does not fulfill all of the criteria for a quarantine pest.

Sphaerulina vaccinii is not known to occur in the UK. Although there is no record of this fungus expanding beyond its native range, it seems capable of establishing in UK blueberry plantations. The introduction of this pest could cause damage to the UK.

It therefore has the potential to satisfy the definition of a quarantine pest. However, this pathogen was only identified in 2021 and therefore the amount of information to carry out a full risk assessment is lacking. There are significant gaps in our understanding of the epidemiology of this disease. There is also some uncertainty on whether this fungus only occurs in parts of Canada and the USA, because it was described very recently and was originally confused with *Septoria* sp., which have a much wider distribution.

References

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