



Canadian Food
Inspection Agency

Agence canadienne
d'inspection des aliments

Pest categorization

Phyllosticta vaccinii Earle

Phyllosticta leaf spot and fruit rot



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Background

The purpose of this categorization is to determine whether *Phyllosticta vaccinii* (Phyllosticta leaf spot and fruit rot) has the potential to satisfy the criteria in the definition for a quarantine pest for the United Kingdom (UK). 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: 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: *Phyllosticta vaccinii* is not currently regulated as a pest in the UK or by any EPPO member countries (EPPO 2022).

Identity of organism

Name: *Phyllosticta vaccinii* Earle (Phyllostictaceae)

Synonyms: *Phyllosticta sparsa* Bonar, *Phyllostinctina vaccinii* Damaree & M.S. Wilcox

English common names: Phyllosticta leaf spot and fruit rot, leaf spot of cranberry, fruit rot of cranberry

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

In the past, there was some debate over whether the fungi *Phyllosticta vaccinii* and *Guignardia vaccinii* were the same species and that *G. vaccinii* was the sexual reproductive stage of *P. vaccinii*. With the use of phylogenetic analysis, this theory has now been refuted.

Phyllosticta vaccinii is distinguished from other members of its genus by having the combination of black-dark brown spherical or sub-spherical fruiting bodies, transparent and single-celled asexual spores surrounded by a slime layer. Cultures of this fungus are olive-green to greenish black when mature (Zhang *et al.* 2013).

Presence in the PRA area

2. Does the organism occur in the PRA area?

If yes

No

Go to 3

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Phyllosticta vaccinii is not known to occur in the PRA area.

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

If yes

If no

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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 was originally identified in Alabama, in the United States (U.S.) in 1897, but has since been reported in many other US states as well as in Canada (Anonymous 1960; Conti *et al.* 2022; Creelman 1967; Earle 1897; Olatinwo *et al.* 2003; Polashock *et al.* 2009; Weidemann *et al.* 1982). North America appears to be the native range of this fungus.

Phyllosticta vaccinii has also been identified in China and Turkey, possibly following introductions from North America. However, the report of *P. vaccinii* in China has since been refuted as a case of misidentification (Zhang *et al.* 2015). The fungus identified in Turkey could not be identified to the species level by any molecular means, although the authors of the paper noted that the isolates resembled *P. vaccinii* as defined by previous authors (Dil *et al.* 2013). Therefore, this report from Turkey remains uncertain.

Phyllosticta vaccinii spread to Wisconsin on cranberry planting stock but did not establish initially, possibly because particular environment conditions (possibly higher temperatures) are necessary for

establishment (University of Wisconsin 2005; Weidemann and Boone 1983). On culture, the growth of *P. vaccinii* was slow at 24°C and optimal at 28°C (Weidemann *et al.* 1982). Higher disease incidence has been noted in cranberry after an incubation treatment of 28°C, suggesting that higher temperatures benefit infection (Weidemann and Boone 1983). Studies on cranberry have also shown that fungal spores are released during wet weather and spread by rain (Sabaratnam *et al.* 2014). Unfortunately, very little is known about the epidemiology of this fungus on blueberry plants. If similar to the findings on cranberry, the successful establishment of this pathogen is likely to be suppressed in countries with a colder climate, such as the UK. However, its presence in Canada indicates that it is still possible.

The host range of *Phyllosticta vaccinii* is restricted to members of the *Vaccinium* genus, attacking highbush blueberry species (*V. corymbosum*), rabbiteye blueberry (*V. ashei*), cranberry (*V. macrocarpon*), farkleberry (*V. arboreum*) and evergreen huckleberry (*V. ovatum*) (Anonymous 1960; Earle 1897; Olatinwo *et al.* 2003). These *Vaccinium* species are present in urban areas (e.g. gardens) in the UK, in the wild, and/or in cultivated areas such as fields, nurseries, and garden centres that could enable the establishment and spread of this fungus (GBIF 2022; RHS 2022b).

Potential for economic and environmental consequences in the PRA area

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?

If yes

Go to 10

No

Go to 11

This fungus causes premature fruit rot, leaf spot and, occasionally, twig blight on its hosts (Cline and Milholland 1995; Creelman 1967; Parris 1959; Phillips *et al.* 2019; Weidemann and Boone 1983). Highbush blueberry is cultivated in the UK and could be at risk of this disease. 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). However, the impacts on blueberry do not appear to be significant. *Phyllosticta* leaf spot on blueberry has been reported as a common disease in parts of the US, but it is considered to be of minor importance (Phillips *et al.* 2019). Similarly, estimations of fruit yield losses due to premature fruit rot have been very minor (at 0.4%) (Cline and Milholland 1995).

Cranberry appears to be much more seriously impacted by this fungus, however the potential for damage in the UK is much less. Cranberry plants are not cultivated commercially in the UK although, similar to blueberry plants, they are grown in allotments and as ornamental plants in gardens (Latham *et al.* 2022; RHS 2022a). Therefore, the sale and cultivation of cranberry plants in the UK could be affected by *Phyllosticta vaccinii*, though the social and economic impacts are not expected to be significant. Finally, native *Vaccinium* species, such as *V. vitis-idaea* and *V. myrtillus* in the wild, could also be affected by this fungus. This seems unlikely though as these species are already present in Canada and parts of the US without any reports of infection.

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.

The distribution of *Phyllosticta vaccinii* appears to be limited to North America. There is no substantial evidence suggesting that it has spread to countries outside of its native region but, based on the behaviour of this pathogen in the U.S., it appears that this fungus can spread to new areas. It also appears that it would be able to establish and spread in the UK climate. However, there is no evidence to suggest this fungus can cause serious economic, social and environmental damage in the UK therefore does not fulfill all of the criteria for a quarantine pest. This conclusion was drawn from the known host range of *P. vaccinii* and its current impact on blueberries and should be re-evaluated in the future if either of these factors change.

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