



Canadian Food
Inspection Agency

Agence canadienne
d'inspection des aliments

Pest categorization

Gloeosporium minus Shear

Gloeosporium leaf spot and stem canker



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Background

The purpose of this categorization is to determine whether *Gloeosporium minus* (Gloeosporium leaf spot and stem canker) 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: *Gloeosporium minus* is not currently regulated as a pest in the UK, nor is it listed as being regulated by any other EPPO member countries (EPPO 2022). However, this fungus is regulated by New Zealand (MPI 2022).

Identity of organism

Name: *Gloeosporium minus* Shear (Dermateaceae)

Synonyms: *Gloeosporium myrtilli* Allesch, *Glomerella rufomaculans* var. *vaccinii* Shear, *Saliastrum myrtilli* (Allesch) Kujala, *Valdensia myrtilli* (Allesch) Petr.

English common names: Gloeosporium leaf spot and stem canker, dieback of blueberry

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

Gloeosporium minus was first identified as a new *Gloeosporium* species on cranberry. The asexual spores of this fungus were described as having long-oval or sub-cylindrical shapes and forming pale-pink, glutinous masses. The spore-producing structures were often twice the length of the spores and narrowed at one end (Shear 1907).

The synonyms of *Gloeosporium minus* (listed above) were also synonyms for the blueberry leaf spot pathogen *Valdensia heterodoxa* (Fungorum 2022; GBIF 2022; Mulenko and Woodward 1996). It is likely that these two pathogens were confused in the past (Polashock *et al.* 2017). Studies in the 1970s suggested that these synonyms for *Valdensia heterodoxa* were invalid and that *Gloeosporium myrtilli* was a distinct fungus (Redhead and Perrin 1972). References to *Gloeosporium minus* have continued to the present day (Pfeiffer *et al.* 2021).

Presence in the PRA area

2. Does the organism occur in the PRA area?

If yes

No

Go to 3

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

The native distribution of this fungus appears to be Canada and the United States (U.S.). *Gloeosporium minus* is most prevalent in the southeastern U.S. (Hildebrand and Nickerson 1989; Milholland 1974), which possesses a humid subtropical climate, experiencing hot, moist summers and mild winters (Pidwirny 2021). *G. minus* has also been recorded in Estonia and Turkey on hosts growing in the wild (Huseyinov and Selçuk 2001; Pisek *et al.* 2015). It is likely that this fungus spread from North America via trade and established in these countries. Finally, this fungus has also been reported in Latvia (Vilka *et al.* 2009) based on its morphological features (L. Vilka, Latvia University of Life Sciences and Technologies, Latvia, pers. comm., August 08, 2022). However, molecular studies of the Latvian isolate were inconclusive (B. Bankina, Latvia University of Life Sciences and Technologies, Latvia, pers. comm., July 15, 2022).

Little information could be found on the spore dispersal of *Gloeosporium minus*. It has been reported that spores are dispersed during windy rain periods (MPI 2017). In addition, spore production and canker development are affected by temperature, with an optimum temperature of 25-30°C. Some

lesions were able to develop at 15°C, but no fruiting structures formed at this temperature (Milholland 1974). In artificial culture, fungal growth was optimal at 30°C and minimal at 12°C. No fungal growth occurred at 6°C (Milholland 1970). Given that the average annual temperature of the UK is between 5-13°C, and the average summer temperature is between 9-20°C (Met Office 2022a), it appears that the climatic conditions in the UK do not favour the establishment and spread of *G. minus*. However, its presence in Estonia, and potentially Latvia, indicates that establishment and spread is still possible. It is possible that very low winter temperatures inhibit the spore viability of *Gloeosporium minus*. This would have suppressed its prevalence in Canada but not in the southeastern U.S., or in European countries such as Estonia or the UK. In addition, environmental conditions in the UK could become more favourable for this fungus with the advent of climate change, with projections of average summer temperatures increasing in the UK by 1.3-5.1°C by 2070 (Met Office 2022b).

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

Yes

If no

Go to 7

Go to 11

The host range of *Gloeosporium minus* is restricted to members of the *Vaccinium* genus, attacking lowbush and highbush blueberry species (*V. angustifolium* and *V. corymbosum* respectively), cranberry (*V. macrocarpon*) and bilberry (*V. myrtillus*) (Huseyinov and Selçuk 2001; Lambert 1990; Milholland 1970; Vilka *et al.* 2009). 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 2022a; 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 Go to 9
If no 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 has been described as the most serious foliar disease of highbush blueberry in the southeastern U.S. (Polashock *et al.* 2017). Symptoms of *Gloeosporium minus* infection include the development of dark-red lesions surrounding leaf scars and flower buds on the stems of young shoots. Over time, the cankers get bigger and the stems turn brown, then grey, then die, causing severe dieback on the plant (Milholland 1974). Large brown to black lesions and red flecks can also develop on the leaves and severe defoliation can occur. Finally, *G. minus* can cause fruit rot, causing rot in at least 90% of inoculated berries (Milholland 1970). It was listed as one of the major fungi isolated from blueberry processor or market samples causing post-harvest losses, present in 2.5% of samples (Lambert 1990)

This pest could cause damage to the hosts present in the UK. Blueberries are commercially produced in the UK and have significant economic value. For example, 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 and cranberry plants are also grown in allotments and as ornamental plants in gardens (Latham *et al.* 2022; RHS 2022a). Finally, *Gloeosporium minus* could have unforeseen environmental impacts by attacking *Vaccinium myrtillus*, a native UK species present in the wild.

Reports of significant damage from *Gloeosporium minus* appears to be limited to areas with a warm climate, such as parts of the US. No reports of significant damage could be found from Canada or from its introduced range, in Estonia and Turkey (Hildebrand and Nickerson 1989; Huseyinov and Selçuk 2001; Pisek *et al.* 2015). Hildebrand and Nickerson (1989) note that this disease is rarely found on the lowbush blueberry in Canada. This disparity in disease impact between countries could be attributed to the environmental conditions required for establishment and spread of this fungus, specifically 25-30°C for optimal infection. It is therefore concluded that *G. minus* is not likely to cause significant damage in the UK.

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.

As mentioned previously, *Gloeosporium minus* is the cause of a very serious foliar disease in highbush blueberry in parts of the US. In addition, this fungus is currently absent from the UK and appears to be capable of spreading to other countries from its native distribution in North America. However, there is no evidence to suggest that this fungus can cause serious economic, social and environmental damage, in countries with colder climates such as Canada, Estonia or the UK. Given its prevalence in the southeastern USA and its environmental requirements, the establishment and spread of *G. minus* requires climatic conditions with warm temperatures and is not likely to establish and become a serious pathogen in the UK.

Therefore, this fungus does not fulfill all of the criteria for a quarantine pest. This conclusion will need to be re-assessed however, if damage is reported in Canada, Estonia, or in any country with a colder climate like the UK. In addition, this categorisation may need to be reviewed if the UK climate warms significantly in future with the continuation of climate change.

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