



## Summary of the EPPO (European and Mediterranean Plant Protection Organisation) PRA on *Chrysobothris femorata* and *Chrysobothris mali* (Coleoptera: Buprestidae) and its implications for Great Britain in preparation for new GB legislation.



*Chrysobothris femorata* (CHRBFE) - <https://www.pestis.org.uk/>

**Fig 1.** Adult of *Chrysobothris femorata* species group. © Eduard Jendek (EPPO)



**Fig 2.** Damage of *Chrysobothris mali*. © James Solomon, USDA Forest Service, Bugwood.org

### Background

*Chrysobothris femorata*, known as the flat-headed apple tree borer, and *C. mali*, known as the Pacific flat-headed borer, are highly polyphagous North American beetles that attack a wide range of deciduous non-conifer trees. *Chrysobothris femorata* was added to the EPPO Alert List in 2019 and both beetles were added to the EPPO A1 list in 2021, following the publication of their joint EPPO PRA (Pest Risk Analysis). Both beetles are considered native to the USA and Canada but have not been found established elsewhere.

These *Chrysobothris* species are pests in commercial nurseries, orchards, and in the wider environment. Historically, *C. mali* was considered one of the worst enemies of newly planted trees and shrubs in its native range and is an emerging concern for certain fruit and nut crops. Damage from *C. femorata* includes the significant mortality of young or stressed trees, loss of tree value and reduction in nursery production. A single larva of *C. femorata* can girdle a tree within one season. Both species are present in forests in North America and are reported to invade nurseries or orchards from woodlands.

The EPPO PRA for these beetles (September 2021) concluded that these pests pose a **moderate** risk (with **moderate** uncertainty) to the EPPO region. Imports of host round wood with bark were considered the most likely pathway for entry. It also estimated that establishment of this pest is **highly likely** outdoors (with **low** uncertainty for *C. femorata* and **moderate** uncertainty for *C. mali*).

A link to the full EPPO PRA can be found at the following webpages:

[Chrysobothris femorata \(CHRBFE\)\[Documents\]| EPPO Global Database](#)

[Chrysobothris mali \(CHRBMA\)\[Documents\]| EPPO Global Database](#)

A summary of the main findings of the EPPO PRA and their significance to Great Britain are given below.

## Crop/sector considered most at risk in GB

These beetles have a very wide host range of deciduous non-conifer trees, including many fruit, forest, and shade species. Maple (*Acer* spp.), apple (*Malus* spp.) and poplar (*Populus* spp.) are common hosts, and *C. mali* attacks many species in the *Prunus* genus, such as cherry, plum, and apricot. Trees such as walnut (*Juglans* sp.), pear (*Pyrus* sp.), and willow (*Salix* sp.) are also attacked by both beetles. Most reported damage of these pests relate to young trees. The full list of confirmed hosts is provided in Annex 4 of the EPPO PRA.

It is uncertain whether the environmental conditions in Great Britain would allow these *Chrysobothris* species to become established. If they did become established, then it is expected that they would have a moderate to high impact on trees in the landscape, nurseries, orchards and forest plantations.

## Summary and conclusions of the EPPO PRA

### Risk of entry

Overall, the EPPO PRA concludes that there is a **high** likelihood of both pests entering the EPPO region (with **moderate** uncertainty). The likelihood of entry on host round wood with

bark was given a **high** score (with **moderate** uncertainty) for both beetles. *Chrysobothris* beetles are suspected to move with host plants between nurseries in the USA. Plants for planting (except seeds, tissue culture, pollen) were assessed as a **moderate** pathway for entry of *C. femorata* and a **low** pathway for entry of *C. mali* (both evaluations with **moderate** uncertainty). Host sawn wood with bark<sup>1</sup> (>6 mm) were assessed as a **moderate** pathway for both beetles (with **moderate** uncertainty). These ratings encompassed the confirmed and uncertain hosts as listed in the EPPO PRA.

The very uncertain hosts detailed in the EPPO PRA consistently scored **low** for likelihood as pathways (plants for planting; round wood with bark; sawn wood with bark) for pest entry (with **moderate** uncertainty), with the exception of plants for planting for *C. mali*, which scored **very low to low** (with **moderate** uncertainty).

Other pathways were assessed for risk of entry. Deciduous wood chips, hogwood and processing wood residues (except sawdust and shavings) had a **low to moderate** likelihood scoring (with **moderate** uncertainty) for both beetles. Cut branches of hosts, furniture and other objects made of wood of host plants scored **low** (with **moderate** uncertainty) for both beetles.

**Significance to GB:** Significant volumes of non-coniferous wood are imported to the UK from Canada and the USA, with an average of 22,000 and 103,000 kg of non-coniferous fuel wood (in logs, twigs, or similar forms; and wood in chips or particles) being annually imported from Canada and the USA respectively (between 2019 and 2022). An average of 53,700 tonnes of non-coniferous sawn wood (thicker than 6mm) is annually imported from the USA, in comparison to 9280 tonnes from Canada<sup>2</sup>. Although many host plants for planting are prohibited from being imported into GB<sup>3</sup>, the EPPO PRA indicates some trade of host plants for planting into the EPPO region from Canada and the USA, such as plants for planting of *Arbutus*, *Carpinus*, *Ribes*, *Rosa*, and *Vaccinium* species.

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<sup>1</sup> The pathway of sawn wood without bark was not given a risk rating by the EPPO PRA as it noted that this pathway was considered to be lower risk than sawn wood with bark.

<sup>2</sup> Overseas trade data table. His Majesty's Revenue and Customs. Available at: <https://www.uktradeinfo.com/trade-data/ots-custom-table/> (accessed 23 October 2023).

<sup>3</sup> Plants for planting of *Acer*, *Betula*, *Cornus*, *Crataegus*, *Corylus*, *Fagus*, *Ficus carica*, *Juglans*, *Malus*, *Populus*, *Prunus*, *Quercus*, *Salix*, *Sorbus*, *Tilia*, and *Ulmus* are all currently prohibited, pending a risk assessment.

Within the current phytosanitary regulations<sup>4</sup>, all plants for planting, and a specific range of wood commodities require a phytosanitary certificate and must meet specific phytosanitary requirements to be imported into Great Britain, and as such may be subject to inspection. Defra would like to further reduce the risk of host commodities infested by the *Chrysobothris* beetles entering Great Britain. Specific measures are proposed that address the risk.

## Risk of establishment and spread

The EPPO PRA suggests that these pests can tolerate a broad range of climates across North America. Although data was lacking on their required temperature or humidity, many climate types present in the distribution of *C. femorata* and *C. mali* are also found in the EPPO region. Some uncertainty was noted regarding the establishment of *C. mali* as no information could be found on its presence in wetter coastal areas. Finally, the presence of the confirmed hosts would aid the establishment and spread of these beetles.

The EPPO PRA concludes that the likelihood of both beetles establishing outdoors on host plants in the EPPO region was **high** (with a **low** rating of uncertainty for *C. femorata* and a **moderate** rating of uncertainty for *C. mali*, given the uncertainty of this pest establishing in wetter areas). A rating was not provided for the likelihood of establishment in protected areas, as both species are not known as pests in protected conditions.

The natural spread of *C. femorata* and *C. mali* was thought to be limited; with an observed flight of up to 110 metres. No specific data was found on their flight capacity though they may be able to fly longer distances to locate hosts, like other relatives in the Buprestidae family. Spread would also be aided by attacks on plants not known to be hosts. Human-assisted spread, via the trade or movement of infested plant material, would allow these *Chrysobothris* beetles to travel longer distances. As a result, the magnitude of pest spread for both species was rated **moderate** (with **moderate** uncertainty).

**Significance to GB:** The EPPO PRA reports that the climate type of the UK, coded as Cfb (temperate, oceanic) under the Köppen Geiger climate classification, is represented in the distribution of *C. femorata* and *C. mali*. In addition, host species of these beetles are present in the wild of Great Britain, in urban areas (such as gardens and streets) and in

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<sup>4</sup> [Commission Implementing Regulation \(EU\) 2019/2072 of 28 November 2019 establishing uniform conditions for the implementation of Regulation \(EU\) 2016/2031 of the European Parliament and the Council, as regards protective measures against pests of plants, and repealing Commission Regulation \(EC\) No 690/2008 and amending Commission Implementing Regulation \(EU\) 2018/2019 \(legislation.gov.uk\)](#)

cultivated areas such as nurseries, orchards and forest plantations, that would aid establishment and spread. To conclude, the rating given for the whole EPPO region on the establishment and spread of this pest should also apply to Great Britain.

## Economic, environmental and social impact

These beetles target newly planted and weakened or stressed trees in their current distribution, especially in the landscape, nurseries, orchards, and forest plantations. Significant economic damage is caused, but only in some areas and on specific tree species. No reports of environmental or social impacts were found for either beetle species. The EPPO PRA concludes that the overall impact of *C. femorata* and *C. mali* to their current area of distribution is **moderate** (with a **moderate** uncertainty).

The potential magnitude of impact in the EPPO region is expected to be more significant, given the more limited availability of pesticides. Damage is expected in areas where the climate is similar to the parts in North America where the pests have caused economic damage. Finally, the EPPO PRA acknowledges that *C. femorata* and *C. mali* would probably be able to find new hosts in the EPPO region. The potential impact for both *Chrysobothris* beetles was therefore rated **moderate to high** (with a **moderate to high** uncertainty).

**Significance to GB:** Economic damage is expected in Great Britain, which possesses a climate type (Cfb) where at least one beetle (*C. femorata*) has been especially damaging. The fruit and nut crops threatened by these pests are of significant value, with domestic production in the UK in 2022 valued at £277 million for (dessert and culinary) apples, £15.1 million for pears (excluding perry pears), £34.1 million for cider apples and perry pears, £10.7 million for plums, and £18.1 million cherries (Horticultural Statistics 2022<sup>5</sup>). The forestry industry in GB would also be at risk, including 219 thousand hectares of oak (*Quercus* sp.), 236 thousand hectares of birch (*Betula* spp.), 106 thousand hectares of sycamore (*Acer pseudoplatanus*), 94 thousand hectares of beech (*Fagus* spp.), 65 thousand hectares of willow (*Salix* spp.) as quantified in 2012 (Forestry Statistics 2023<sup>6</sup>). Therefore, there could be a substantial economic impact on growers if this pest established in Great Britain.

In addition, some host species are present in the wild of Great Britain, such as poplar, birch, oak, and willow, or grown as ornamental species in gardens, landscaping, and as

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<sup>5</sup> [Latest horticulture statistics - GOV.UK \(www.gov.uk\)](https://www.gov.uk)

<sup>6</sup> [Ch1\\_Woodland.pdf \(forestresearch.gov.uk\)](https://forestresearch.gov.uk)

urban trees in cities. The introduction of these *Chrysobothris* beetles could cause significant social or environmental damage to these species.

## Risk management recommendations

The following is a summarised version of the EPPO Panel on Phytosanitary Measures recommendations for the high-risk pathways; host plants for planting, round wood, sawn wood (>6 mm), cut branches of host species; as well as for deciduous wood chips, hogwood, processing wood residues and wood packaging material. See Section 16.1 of the EPPO PRA for the recommended measures in more detail, and Section 8 for the assessed pathways of pest entry. The EPPO Panel recommended that:

(1) Host plants for planting (except seeds, tissue cultures, pollen) should:

come from a Pest Free Area as well as be stored and transported in conditions preventing infestation.

Or

come from a pest-free production site as well as be stored and transported in conditions preventing infestation.

Or

be subject to a systems approach (combining treatment of the crop with options such as importing plants with a maximum diameter, requiring a visual examination of the plants, visual inspection of the consignment etc.)

Or

Post-entry quarantine for 2 years.

(2) Host round wood should:

Be stored and transported in conditions preventing infestation.

And

come from a Pest Free Area.

Or

be subject to a heat treatment.

Or

be subject to irradiation.

Or

be subject to fumigation with sulfuryl fluoride (for debarked wood not exceeding 20cm in cross-section)

(3) Host sawn wood (>6mm) should:

Come from a Pest Free Area.

Or

be subject to a heat treatment.

Or

be subject to irradiation.

Or

be subject to fumigation with sulfuryl fluoride (for debarked wood below 20cm in cross-section)

(4) Deciduous wood chips, hogwood, processing wood residues should:

come from a Pest Free Area as well as be stored and transported in conditions preventing infestation.

(5) Wood packaging material should:

Meet ISPM 15 requirements.

(6) Cut branches of hosts should:

come from a Pest Free Area as well as be stored and transported in conditions preventing infestation.

Or

come from a pest-free production site as well as be stored and transported in conditions preventing infestation.

(7) Unconfirmed host plants for planting should:

Be accompanied by a Phytosanitary Certificate.

**Significance to GB:** Within the current phytosanitary regulations<sup>2</sup>, all plants for planting, and a specific range of wood commodities require a phytosanitary certificate and must meet specific phytosanitary requirements to be imported into Great Britain, and as such may be subject to inspection. Wood packaging material must meet ISPM 15 requirements

to enter Great Britain. Defra would like to further reduce the risk of host commodities infested by the *Chrysobothris* beetles entering Great Britain. Using the EPPO PRA recommendations, new GB regulations will be drafted with the aim of further mitigating the risk of introducing this pest.

### Environmental Principles

This summary of the EPPO PRA has been undertaken taking into account the environmental principles laid out in the Environment Act 2021. Of particular relevance are:

**The prevention principle**, which means that any policy or action taken, or not taken should aim to prevent environmental harm.

**The precautionary principle**, which assists the decision-making process where there is a lack of scientific certainty.