Department for Environment Food & Rural Affairs

Rapid Pest Risk Analysis (PRA) for: *Melittomma sericeum*

November 2024

Summary and conclusions of the rapid PRA

This rapid PRA shows:

Melittomma sericeum (Coleoptera: Lymexylidae) or chestnut timberworm is a wood boring beetle native to North America (USA and Canada). Before the 1900s, *M. sericeum* was deemed a damaging pest of American chestnut (*Castanea dentata*) affecting timber quality. Since the introduction of chestnut blight (*Cryphonectria parasitica*) and the dramatic decline in American chestnut, *M. sericeum* has become less notable, with very few specimens being recorded each year.

Likelihood of entry

The risk of pathways of entry were assessed as **moderately likely in the case of timber imports, unlikely for wood packaging material and very unlikely for plants for planting and cut branches, with medium to high confidence in all cases**. Wood as a pathway e.g. timber, is deemed the most likely pathway, with known association of the pest with sapwood and heartwood and a relatively high trade volume of sawn hardwood from USA. However, timber and sawn wood are subject to requirements that would limit the likelihood of pest presence, and no previous interceptions have been made on timber. As wood packaging material (WPM) is used to convey goods, there is a high volume of trade, but due to the ISPM 15 requirements and no records of *M. sericeum* on WPM, the likelihood is considered low. *Quercus* and *Castanea* plants for planting from North America

are prohibited. Cut branches and other parts of plants as a pathway is considered very unlikely due to low volumes of trade.

Likelihood of establishment

Outdoor establishment in the UK is assessed as unlikely due to the difference between the pest's native climate, and the limited presence of known hosts, such as *C. dentata* and *Quercus alba,* in the PRA area. However, confidence level is low due to a lack of data regarding suitability of native/naturalised tree species as hosts and specific lifecycle requirements.

Economic, environmental and social impact

Economic impacts have been rated as small with low confidence. If damage to UK tree species is similar to *C. dentata*, timber being produced would be degraded and cause significant commercial losses. However, this depends on whether our native/naturalised trees are suitable hosts and are as susceptible to damage. Which appears unlikely as infestation is restricted to dead/decaying wood in the absence of American chestnut, and any damage to timber would be negligible or similar to other native wood boring beetles.

Environmental impacts are rated as small with medium confidence. Evidence suggests that *M. sericeum* behaves more as a secondary pest, being unlikely to cause tree mortality but may intensify tree health issues. *Melittomma sericeum* could exacerbate issues caused by other fungal pests such as chestnut blight (*Cryphonectria parasitica*). However, this is unlikely as females rely on existing wounds for oviposition and larvae are not thought to be associated with fungi.

Social impacts are rated as small with medium confidence. Timber and nut production are growing industries in the UK, especially in the southeast. Damage to these industries could lead to loss of employment for local communities. However, damage to tree health is not likely to be severe enough to cause issues that would affect these industries.

Endangered area

This pest is not expected to cause an unacceptable level of economic damage where it could establish. Therefore, there is no endangered area.

Risk management options

Whilst the pest is not present in the PRA area, continued exclusion is preferrable, due to the uncertainty over the susceptibility of tree species in the UK. Current import regulations for plants for planting, timber and wood packaging material are considered sufficient to limit the likelihood of introduction.

If *M. sericeum* did enter the PRA area, measures for control would be similar to that of other wood-boring beetles, such as felling and removal of infested trees, and surveillance

for adults. Other methods may include, limiting fires and other causes of wounds/lesions that may be used as oviposition sites.

Key uncertainties and topics that would benefit from further investigation

The key uncertainty for this pest is the suitability the UK's native/naturalised trees as hosts. *Melittomma sericeum* appears to display high host preference for *C. dentata,* where the absence of this host has resulted in a population decrease and removal of status as a 'notable' pest. Yet, more information is required about the pest host range and the potential damage it can cause to other host species.

Images of the pest

Photo 1 Melittomma sericeum adult (Male) 	*Photo 2 Melittomma sericeum damage* 
BugGuide.net, F. Guamieri, 2009	*Bugwood.org, J. Solomon, USDA Forest Service, 1999*

Is there a need for a detailed PRA or for a more detailed analysis of particular sections of the PRA? If yes, select the PRA area (UK or EPPO) and the PRA scheme (UK or EPPO) to be used.

No	✓				
Yes		PRA area: UK or EPPO		PRA scheme: UK or EPPO	

Given the information assembled within the time scale required, is statutory action considered appropriate / justified?

Yes Statutory action		No Statutory action	✓

There is no definitive evidence that this pest will affect native/naturalised tree species. If infestation and damage is similar to that on American chestnut (*C. dentata*), there is a risk to hardwood timber production in the forestry industry. However, this is unlikely to be the case, and there is no evidence of *M. sericeum* having a significant environmental or social impact.

Additionally, this PRA rates the pathways for entry from moderately likely to very unlikely, due to the regulations in place for Canada and the United States. Existing legislation prohibits host plants for planting from these areas, and other pathways e.g. branches, timber, and wood packaging material are subject to phytosanitary measures that are believed to be sufficient in reducing the likelihood of pest association. Therefore, the likelihood of introduction into the PRA area is already being reduced and no further mitigations are required.

Stage 1: Initiation

1. What is the name of the pest?

Melittomma sericeum (Harris), common name: chestnut timberworm

Synonym: *Lymexylon sericeum* Harris

2. What initiated this rapid PRA?

In January 2018, an interception of *M. sericeum* was made in Germany on white oak logs (*Quercus alba*) from the USA. The German express PRA which followed, judged the phytosanitary risk for Germany and EU member states as high (JKI *et al.*, 2018). In June 2018, this pest was added to the UK Plant Health Risk Register with an overall rating of 30.

An assessment is required to further investigate risk and whether the pest should be listed as a Quarantine Pest.

3. What is the PRA area?

The PRA area is the United Kingdom of Great Britain and Northern Ireland

Stage 2: Risk Assessment

4. What is the pest's status in the plant health legislation, and in the lists of EPPO[1]?

The legislation for Great Britain is the Phytosanitary Conditions Regulation (assimilated regulation (EU) 2019/2072)[2]. The legislation which applies to Northern Ireland is the EU legislation: 2019/2072 and 2016/2031[3].

This pest is not listed in the EU plant health legislation and is not recommended for regulation as a quarantine pest by EPPO, nor is it on the EPPO Alert List.

[1] https://www.eppo.int/ACTIVITIES/quarantine_activities

[2] https://www.legislation.gov.uk/eur/2019/2072 (link to latest consolidated version)

[3] The latest consolidated version can be accessed on the left-hand side of https://eur-lex.europa.eu/eli/reg_impl/2019/2072/oj

5. What is the pest's current geographical distribution?

In North America, the pest is distributed across eastern USA and southeastern parts of Canada. Figure 1 shows a map generated by gbif.org with specimen occurrence data from 1977 to 2023. While not comprehensive and unlikely to display population characteristics (e.g. density, dispersal), this map gives an overview of the distribution range for *M. sericeum*.

In Europe, *M. sericeum* is absent, with only one interception being made in 2018 in Germany on oak logs from the USA (JKI *et al.*, 2018). No interceptions in Europe have been reported since.

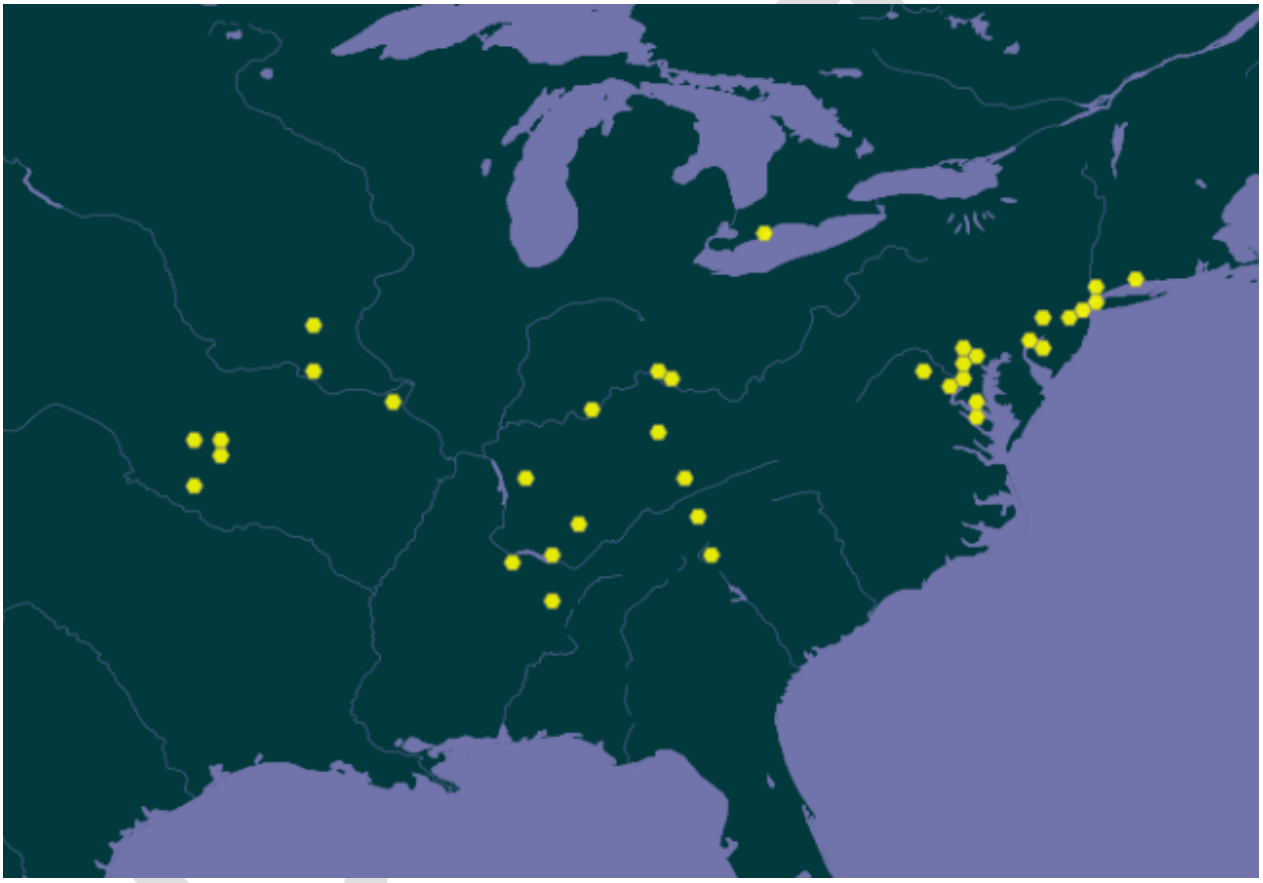

Figure 1: Distribution of *Melittomma sericeum* in North America

Melittomma sericeum (Harris, 1841) in GBIF Secretariat (2023). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2024-05-22. © OpenStreetMap

Table 1: Distribution of *Melittomma sericeum*	
North America:	Present in Canada and USA, mostly in eastern forests of USA. States with recorded presence: Alabama, Illinois, Indiana, Maine, Massachusetts, New York, North Carolina and Pennsylvania (Sanderson & Glenn, 1963).
Central America:	
South America:	
Europe:	Absent, intercepted only (Germany).
Africa:	
Asia:	
Oceania:	

6. Is the pest established or transient, or suspected to be established/transient in the UK/PRA Area?

This pest is not known to be present in the UK. There have been no findings of *M. sericeum* in the wider environment, nor has it been intercepted in England and Wales by the Plant Health and Seeds Inspectorate.

7. What are the pest's natural and experimental host plants; of these, which are of economic and/or environmental importance in the UK/PRA area?

Melittomma sericeum has been reported from chestnut (*Castanea*), oak (*Quercus*), and elm (*Ulmus*) (Wheeler, 1986). Although limited data are available for each of these hosts and the susceptible species. While American chestnut (*Castanea dentata*) is a known host, the susceptibility of other chestnut species such as the sweet chestnut (*Castanea sativa*) is unknown. Two species of oak have been implicated as major hosts, *Quercus alba* (White oak) and *Q. rubra* (Red oak), but information is limited or dated. Although Wheeler (1986) lists Ulmus as a host, this statement lacks any detail or evidence, and there is no other literature available to support this. Therefore, elm will not be discussed further.

The main host of *M. sericeum* was American chestnut (*C. dentata*), on which it was reported as being destructive, causing pinhole damage to the timber. However, from 1904 to 1940, American chestnut populations suffered a dramatic decline of around 3.5 billion trees (Brewer, 1995), caused by sweet chestnut blight, as a result of the introduction of the fungus *Cryphonectria parasitica* from East Asia (Solomon, 1995). As the main host of *M. sericeum*, the loss of *C. dentata*, has in recent years resulted in a correlated decline in *M. sericeum* to the extent that this insect is by some, now considered as a 'collector's item' (Wheeler, 1986).

Hopkins (1910) states that *M. sericeum* also attacks red oak (*Quercus rubra*), where damage in mature trees is similar to that of chestnut. This information is of concern as red oak is widely distributed in the PRA area. While not as economically or environmentally important as native oak species, the presence of red oak could aid in establishment and spread. However, red oak is only mentioned in this one source from 1910, and no other references have been made since. As red oak timber is often used for furniture in the USA, pest-related damage is well recorded and no mention of *M. sericeum* has been made. Therefore, red oak is unlikely to be a host of this pest.

American white oak (*Quercus alba*) is now considered the main host for *M. sericeum* (Solomon, 1995). Justification is not provided, only references of reported findings of larval specimens on decaying white oak logs (Blatchley, 1910; Wheeler, 1986). Whether this is due to the ease of inspecting decaying logs compared to live trees for larva, or the fact that *M. sericeum* only develops on dead trees in the absence of American chestnut, is uncertain. White oak is not native to the PRA area and is only grown as an ornamental. Therefore, it is unlikely that white oak would aid establishment of *M. sericeum* or have an impact on the UK.

Considering *Castanea* and *Quercus* are both members of the Fagaceae family, and the movement of *M. sericeum* from *C. dentata* to *Q. alba*, there is the possibility that this insect may adapt to other members of Fagaceae. Due to the significant damage to American chestnut, other chestnut species, specifically sweet chestnut (*Castanea sativa*) are potential hosts of concern. While sweet chestnut is present in the United States, shown in figure 2, populations are small and isolated. Therefore, it is difficult to say whether sweet chestnut is a possible host.

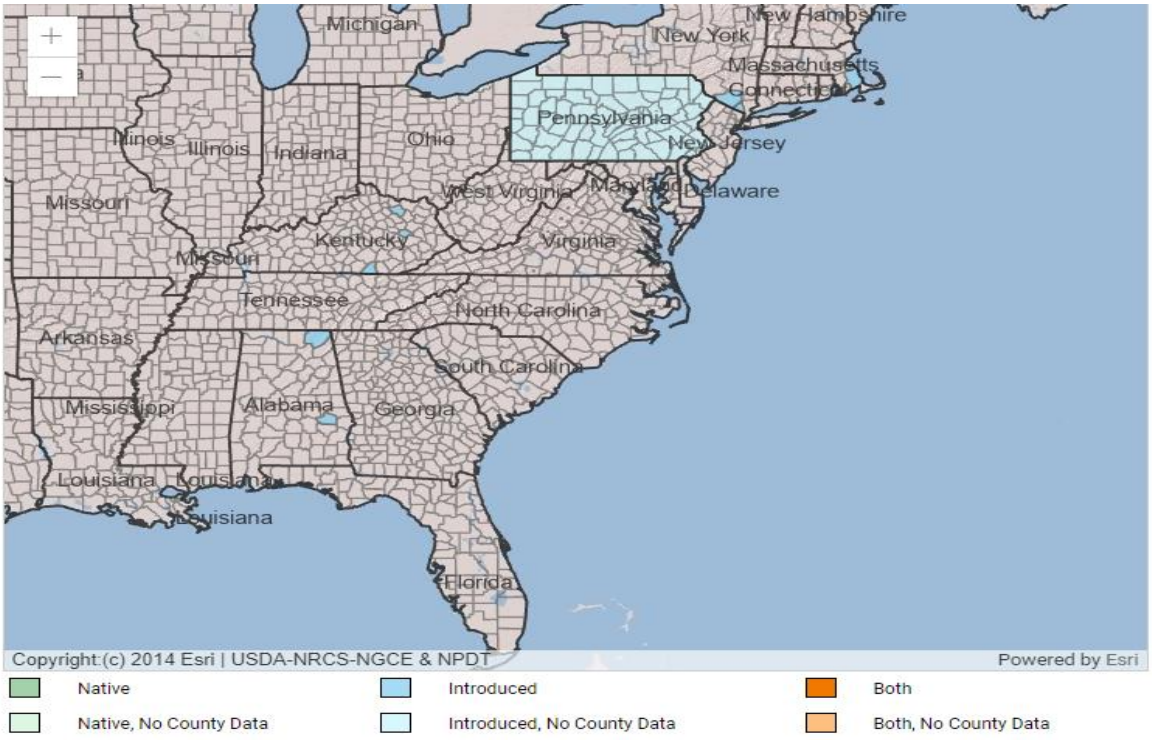

Figure 2: Distribution map of Castanea sativa (sweet chestnut)

USDA, NRCS. [2024]. The PLANTS Database (https://plants.usda.gov/home/plantProfile?symbol=CASA27 , 29/05/2024). National Plant Data Team, Greensboro, NC USA.

8. Summary of pest biology and/or lifecycle

Morphology

Adults are chestnut brown and covered in fine silky setae, the body is slender and elongate, with a deflexed head and slightly serrate antennae. Adults range from 11 to 15 mm in length (Solomon, 1995). Adult males have maxillary palps, suggested to contain chemoreceptors involved in mating, which are absent in females.

Larvae are white to yellowish brown, the body is elongate and cylindrical with a large yellow head, hooded by the prothorax. Full grown larvae range from 15 to 18mm in length. The ninth abdominal segment is enlarged with a dark brown scoop-like structure with toothlike spines (Solomon, 1995). This is suggested to aid with removal of frass from

tunnels, primarily seen with fungi-associated beetles e.g. *Elateroides dermestoides*,(also Lymexylidae) to allow fungal spores to grow (Toki, 2023).

Lifecycle and damage

Females lay eggs in bark cervices or under bark scales, often at wound sites or fire scars. Larve hatch and burrow deep into wood, producing barely visible holes, often surrounded by white frass. As larvae feed and grow, they produce galleries in sapwood and heartwood. Holes in wood range from 0.3 to 6.4 mm in diameter. This beetle generally avoids the cambium layer until the final instar where pupation occurs close to the surface of the tree. Adults then chew circular exit holes and emerge for mating (Solomon, 1995).

It is believed that one generation may take multiple years. Limited information is available on emergence dates or degree day (DD) thresholds. Findings of adults recorded on gbif.org, suggests adult emergence and activity takes place from June to early August. Hopkins (1903) suggests that adults emerge about the time chestnut is in bloom, mid-June to early July. Adults are reported to be nocturnal, with the majority of sightings being from light traps, using black and white light (Sanderson & Glenn, 1963).

9. What pathways provide opportunities for the pest to enter and transfer to a suitable host and what is the likelihood of entering the UK/PRA area?

Host plants for planting

This pest could be associated with host plants for planting, in the form of eggs, larvae, or pupae. However, under Annex 6B of the Commission Implementing Regulation (EU) 2019/2072, importation of live trees of *Castanea* and *Quercus* from the USA and Canada are prohibited, pending a risk assessment. Therefore, **this pathway can be deemed very unlikely with high confidence**.

Plants for planting	Very unlikely	✓	Unlikely		Moderately likely		Likely		Very likely	
Confidence	High Confidence	✓	Medium Confidence		Low Confidence				

Plant parts, e.g. cut branches

This pest could be associated with plant parts, such as cut branches, in the form of eggs, larvae, or pupae. No records are available on the likelihood of *M. sericeum* being associated with these parts. However, as this pest is a small wood boring beetle, it is possible it might be found in the wood of cut branches. As with plants for planting, plant parts of *Castanea* and *Quercus* from North America are prohibited. From https://www.uktradeinfo.com/, importation of 'Fresh foliage, branches and other parts of

plants, without flowers or flower buds (CN code: 06042090)' from USA is low (Appendix table 1A), with no imports from Canada in the last 5 years (2019 – 2023). As this is a general category which includes all cut branches and other plant parts, a significant proportion would be from non-host plant groups (e.g. not Fagaceae) and unlikely to be associated with *M. sericeum*. Furthermore, these figures include imports from the entire USA, as this insect is restricted to eastern North America, the actual amount of cut branches and plant parts at risk is likely lower. **This pathway is rated as very unlikely with high confidence.**

Plant parts	Very unlikely	✓	Unlikely		Moderately likely		Likely		Very likely	
Confidence	High Confidence	✓	Medium Confidence		Low Confidence				

Timber

This pest could be associated with timber of host plants, in the form of larvae or pupae. This is the most likely pathway. Trade data from Forest Research states that imports of sawn hardwood from the USA have been higher than other countries (except in 2022). In 2021, 19% of sawn hardwood was imported from the USA, followed by Latvia (14%) and Cameroon (10%) (Forest Research, 2022).

Data extracted from https://www.uktradeinfo.com/ of imports of *Quercus* wood showed that volume of this trade was high, as shown in table 2. Non-Coniferous wood was also recorded as moderately high (Appendix table 2A), but as genera could not be separated, there is uncertainty regarding the proportion of imports attributed to *Castanea*. Therefore, this rating is based primarily on *Quercus* wood imports. The phytosanitary measures in place for the importation of *Castanea* and *Quercus* wood (discussed in section 17) from the USA and Canada would limit the possibility of viable larvae and pupae being introduced through this pathway. The German interception in 2018 was made on white oak logs rather than sawn wood. These logs were imported under Commission Decision 2005/359/EC, a derogation which the UK did not make use of. Therefore, there have been no interceptions made on timber to our knowledge.

Additionally, the current population of *M. sericeum* appears relatively small compared to other wood boring beetles of concern from the USA, such as *Agrilus bilineatus*. With this and the knowledge that no UK or EU interceptions have been made on timber, **this pathway is rated as moderately likely with medium confidence.**

Timber	Very unlikely		Unlikely		Moderately likely	✓	Likely		Very likely	
Confidence	High Confidence		Medium Confidence	✓	Low Confidence				

Table 2: UK imports of *Quercus* spp. wood (CN 44079115, 44039100, 44079139, 44079190)		
	Weight in tonnes (t), split by country	
Year	**Canada**	**United States**
2019	3406.9	31809.5
2020	3977.6	27836.3
2021	4756.7	29041.2
2022	4411.3	22079.5
2023	3099.5	21754.8

Wood packaging material (WPM)

Similar to timber, this pest could be associated with WPM, in the form of larvae or pupae. In the USA, WPM pallets are mostly made from pine, but can also include oak. As wood used in WPM is likely a lower quality than sawn wood, the likelihood of pest association is higher. According to https://www.uktradeinfo.com/, there have been low levels of trade of WPM as a commodity from the USA and Canada to the UK. However, exact quantities of WPM used for conveying goods is difficult to estimate but is expected to be very high. There is uncertainty regarding the possibility of a *M. sericeum* adult emerging from this material and finding a suitable host nearby.

WPM used to import goods into the UK must be compliant with the ISPM15, where it must be made of debarked wood and heat treated or fumigated and marked with the ISPM15 stamp. These measures would most likely be adequate for *M. sericeum* but depends whether ISPM15 is followed properly. Additionally, no interceptions of this pest have been reported on WPM, therefore **this pathway is rated as unlikely with medium**.

Wood packing material	Very unlikely	☐	Unlikely	☑	Moderately likely	☐	Likely	☐	Very likely ☐
Confidence	High Confidence	☐	Medium Confidence	☑	Low Confidence	☐			

Table 3: UK imports of wood packaging material (CN: 44152090, 44152020)		
	Weight in tonnes (t), split by country	
Year	**Canada**	**United States**
2019	38.9	352.1
2020	11.0	276.2
2021	13.6	360.2
2022	16.2	81.5
2023	57.0	527.5

10. If the pest needs a vector, is it present in the UK/PRA area?

Melittomma sericeum is a free-living organism and no vector is required.

11. How likely is the pest to establish outdoors or under protection in the UK/PRA area?

Outdoors

The climate classification of Köppen-Geiger indicates that the climate of this pest's native range, eastern USA is relatively similar to that of the UK, although, *M. sericeum* occurs in regions with more degree days (DD) than the UK (Fig, 3). The pest's distribution area in the USA and Canada experiences 500 to 4,500, compared to the 1 to 1000 in the PRA area. This suggests that the pest might be close to its northerly limit in the UK. It has been suggested this pest's lifecycle takes several years (Solomon, 1995). In the UK climate, the duration could be at its lengthiest, though there are not numerical estimations in the literature. Therefore, climate suitability is considered as unlikely. There is limited data regarding the development of *M. sericeum,* so the climate suitability of the UK is uncertain.

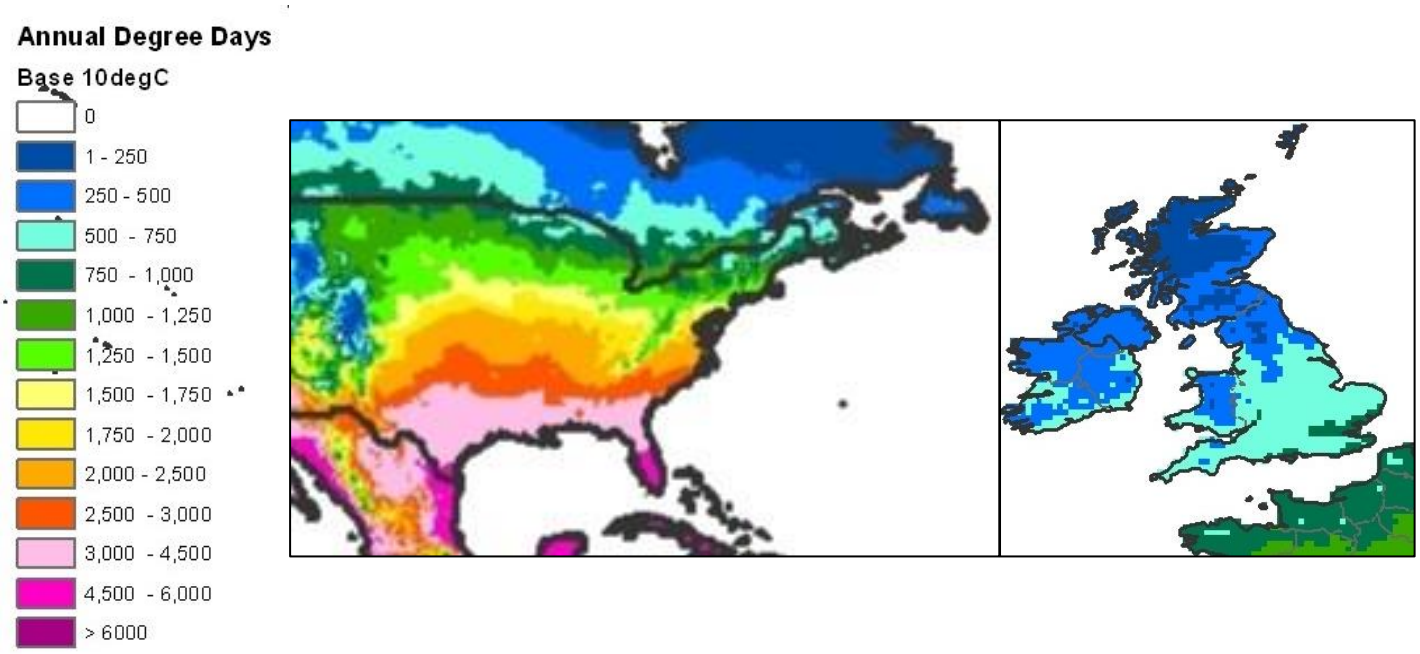

Figure 3. Degree day (DD) maps for North America and the UK.

The pest's native range could be limited by the availability of hosts, rather than climate suitability. The immature stages of wood-boring beetles are often protected from the extremes of the surrounding air temperatures and due to the supposed long development time, the beetle may have some flexibility to its lifecycle.

The reported hosts for *M. sericeum* are *Castanea* and *Quercus*. These tree genera are widespread in the PRA area. However, there is a significant degree of uncertainty regarding the suitability of native/naturalised tree species for this pest. The only species listed as hosts are American chestnut (*C. dentata*) and white oak (*Q. alba*), neither of which are present in large numbers in the UK. As previously discussed, sweet chestnut and red oak are widely distributed in the PRA area and could aid in establishment, but their suitability as hosts is unconfirmed and appears unlikely. There have been no supported records of this pest on broadleaved species which are widespread in the UK. Literature suggests that *M. sericeum* displays a high host preference, with the loss of American chestnut resulting in a dramatic decline in the pest population. T**he likelihood of establishment outdoors is rated as unlikely with low confidence.**

Under protection

Trees of *Castanea* and *Quercus* are not grown under protection in the UK. Therefore, **the likelihood of establishment of *M. sericeum* under protection is rated as very unlikely with high confidence.**

Outdoors	Very unlikely	☐	Unlikely	☑	Moderately likely	☐	Likely	☐	Very likely ☐
Confidence	High Confidence	☐	Medium Confidence	☐	Low Confidence	☑			
Under Protection	Very unlikely	☑	Unlikely	☐	Moderately likely	☐	Likely	☐	Very likely ☐
Confidence	High Confidence	☑	Medium Confidence	☐	Low Confidence	☐			

12. How quickly could the pest spread in the UK/PRA area?

There is currently no information available on the spread capabilities of *M. sericeum*. The pest is capable of flight, but potential distance is unknown. Species from the Lymexylidae family, such as *Elateroides dermestoides*, are energetic, moving very rapidly and taking flight if disturbed (ukbeetles.co.uk). Development for *M. sericeum* is estimated to take several years (Solomon, 1995), which would limit the rate of spread. Additionally, host availability would impact spread capability. The habitat of Lymexylidae beetles in the UK is deciduous woodland and they mostly feed on mature oaks in various stages of decay, including old trunks, cut stumps, and logs (ukbeetles.co.uk), which appears similar to the behaviour of *M. sericeum* in the absence of American chestnut. Therefore, natural spread may depend on woodland hygiene and the presence of decaying material, especially of oak and chestnut. **Natural spread is rated as slowly with low confidence.**

Melittomma sericeum could be transported longer distances through human-assisted spread with timber or wood packaging material. However, there is no data regarding spread of this pest through these pathways in North America, the only evidence is the interception made in Germany. **Human-assisted spread is considered slowly with low confidence.**

Natural Spread	Very slowly	☐	Slowly	☑	Moderate pace	☐	Quickly	☐	Very quickly ☐
Confidence	High Confidence	☐	Medium Confidence	☐	Low Confidence	☑			
With trade	Very slowly	☐	Slowly	☑	Moderate pace	☐	Quickly	☐	Very quickly ☐
Confidence	High Confidence	☐	Medium Confidence	☐	Low Confidence	☑			

13. What is the pest's economic, environmental and social impact within its existing distribution?

As discussed by Hopkins (1910), insects such as *M. sericeum* attack the wood of living timber but do not contribute significantly to the health of the tree. They produce wormhole and pinhole damage in the wood, which results in defective, low-grade timber. Which were either discarded as worthless culls or sold at a reduced value. Furthermore, these defects are not detected until the trees have been felled, transported to the mill and processed, adding to the commercial losses.

In the years leading up to the 20th century and before the introduction of chestnut blight, *M. sericeum* was deemed an important economic pest in eastern forests of the USA, with one report stating 50 – 90% of mature trees as being infested and thus affecting the wood for many purposes (Craighead, 1950). Diseased and dying chestnut trees were 'riddled' with *M. sericeum* larvae, to the extent that 'nearly every tree of merchantable size contained some injury' (Solomon, 1995). Timber from these trees was downgraded, resulting in sizable losses, and being used as material for barns and other structures. It is estimated that affected timber suffered an average value reduction of 30% (Hopkins, 1910). The estimated loss caused by *M. sericeum* was an average of $1 million per year (Entomological Society of Ontario, 1895). Recently, due to American chestnut timber becoming rare, it is being salvaged, reprocessed and sold (at a relatively high price) as reclaimed timber, named 'Wormy Chestnut'. One source suggests that the numerous small holes made by *M. sericeum* made chestnut more appealing for the furniture industry, by allowing the glue to get a good grip (Buttrick, 1999).

Packard (1869) reported that the European Lymexylidae species greatly injured oak trees and ship timber, but that the native species *M. sericeum* (reported as *Lymexylon sericeum* – a synonym of *M. sericeum*) was too rare to be of any harm. It appears that the link between M. sericeum and chestnut wood defects was not made until 1894, when pupae were found in chestnut trees and stumps. Previously considered rare, it was a surprise that it was evidently causing these defects and was then termed one of the 'worst timber pests known' (Howard, 1895).

However, due to the significant loss of American chestnut, from chestnut blight, *M. sericeum* is no longer considered a pest of note. In the literature, *M. sericeum* is mostly mentioned in passing or with the description of 'former pest species'. Currently, *M. sericeum* is not listed in any pest lists for the United States or Canada. Additionally, due to limited findings of this pest, the population levels are considered quite low. In the absence of American chestnut, there is no evidence that *M. sericeum* causes significant economic, environmental, or social impacts. This beetle appears to behave as a secondary pest, developing mainly on unhealthy or decaying white oak trees/logs. For these reasons, **the impacts are rated as small with high confidence.**

Impacts	Very small	☐	Small	☑	Medium	☐	Large	☐	Very large ☐
Confidence	High Confidence	☑	Medium Confidence	☐	Low Confidence	☐			

14. What is the pest's potential to cause economic, environmental and social impacts in the UK/PRA area?

Economic

Quercus and *Castanea* are widespread in the UK, contributing to hardwood timber production, the natural woodland, hedgerows, and amenity trees, and are culturally significant. The main economic impact expected from this pest in the UK is to timber production. Potential infestation rates are difficult to predict. Larval holes have been recorded in 50 – 90% of trees (Craighead, 1950), but only on American chestnut and possibly while stressed from chestnut blight. UK *Castanea* and *Quercus* species are not known to be hosts, but if they were suitable and *M. sericeum* only infested dead/decaying wood (as it does currently in North America), damage to timber would be negligible. Any larval damage would not be significantly higher than native wood-boring beetles. Additionally, in the UK, hardwood timber such as chestnut and oak are not as important to the timber and wood industry compared to softwood production, contributing a small percentage to total roundwood and sawn wood trade in the UK (Forest Research, 2023).

In the pests native range, isolated populations of sweet chestnut exist (Missouri Botanical Gardens, 2024) but are not grown commercially, so estimation of impact to sweet chestnut is hard to predict. However, chestnut timber and nut production has experienced a revival, especially in Southern England (e.g. Kent). Damage to these trees from *M. sericeum* could have significant impacts and be harmful to these industries and their revenues. **Economic impact is rated as small with low confidence.**

Environmental

Due to the lack of research regarding the impacts *M. sericeum* has on tree health and mortality on UK species, it is difficult to predict the environmental impacts. However, as the pest is now primarily found on white oak logs, this suggests that *M. sericeum* is a secondary pest and only dead/dying trees are suitable hosts. Therefore, infestations of the pest may intensify tree health issues but are unlikely to be the cause. Additionally, tunnels produced by this pest are small and described as 'pinhole'. While affecting water flow and causing some structural degradation, they are unlikely to significantly impact the tree, except in the case of standing dead trees (Ulyshen, 2016). Therefore, *M. sericeum*-made holes would not cause significant impacts.

There is the possibility that *M. sericeum* could exacerbate the issues from other fungal pests, for example, chestnut blight (*C. parasitica*). While *M. sericeum* has not been implicated as a vector of chestnut blight, the entry holes and tunnels produced by the larvae could allow entry of fungal spores. However, as noted previously, females prefer wounds as the site of oviposition so these sites would already be entry points for fungi. **Environmental impact is rated as small with medium confidence.**

Social

The most likely social impact would result from *M. sericeum* damage to oak and chestnut associated industries. As mentioned, chestnut timber and nut production has experienced a revival in certain parts of the UK (Forest Research, 2024). These industries are locally important, as a source of employment and pride. The amount of damage caused by the pest is likely to be low and should not have a significant impact on either timber production or tree health. **Social impact is rated as small with medium confidence.**

Economic Impacts	Very small	☐	Small	☑	Medium	☐	Large	☐	Very large	☐
Confidence	High Confidence	☐	Medium Confidence	☐	Low Confidence	☑				
Environ - mental Impacts	Very small	☐	Small	☑	Medium	☐	Large	☐	Very large	☐
Confidence	High Confidence	☐	Medium Confidence	☑	Low Confidence	☐				
Social Impacts	Very small	☐	Small	☑	Medium	☐	Large	☐	Very large	☐
Confidence	High Confidence	☐	Medium Confidence	☑	Low Confidence	☐				

15. What is the pest's potential as a vector of plant pathogens?

Two beetles from the family Lymexylidae, *Elateroides dermestoides* and *Elateroides flabellicornis*, are believed to form symbiotic relationships with fungi that grow on the walls of their tunnels. *Elateroides dermestoides* (synonym: *Hylecoetus dermestoides*) is present in the UK, and bores in to a wide range of tree species, inoculating their tunnels with *Alloascoidea hylecoeti*, which the larvae then feed on (Toki, 2023). However, there is no evidence of any other species from the Lymexylidae family being ambrosia beetles. Additionally, *M. sericeum* tunnels display little to no staining, suggesting a lack of fungal growth. Therefore, *M. sericeum* is not believed to be a vector of plant pathogens.

16. What is the area endangered by the pest?

This pest is not expected to cause an unacceptable level of economic damage where it could establish. Therefore, there is no endangered area.

Stage 3: Pest Risk Management

17. What are the risk management options for the UK/PRA area?

Exclusion

There are current phytosanitary measures from the Commission Implementing Regulation (EU) 2019/2072 in place for *Quercus* and *Castanea* from certain third countries including the USA and Canada. Under Annex 6A, plants with leaves, other than fruit and seeds of these genera are prohibited, and under 6B both genera are listed as high-risk plants prohibited from import pending risk assessment.

Additionally, *Quercus* wood from the USA must be squared, bark-free and the moisture content <20%, bark-free and disinfected, or if sawn, undergone kiln drying to <20% moisture content. *Quercus* wood also requires an inspection prior to export. *Castanea* wood being introduced to the UK, is required to be bark free, originate from an area free from *C. parasitica*, or have undergone treatment such as kiln-drying or fumigation. Due to measures for *Agrilus bilineatus*, wood of *Castanea* and *Quercus* must be bark-free, and undergone heat treatment or appropriate ionizing irradiation. These measures appear to be sufficient for the exclusion of other wood boring beetles such as *M. sericeum*.

Eradication, containment and controls

As *M. sericeum* is no longer considered a significant pest in its native range and no outbreaks have been recorded, no control methods have been pursued specifically for this pest. As a result, there are no data available regarding possible control or eradication methods. Additionally, due to limited data on spread, it is difficult to estimate best controls for containment. Contingency plans for other wood-boring beetles could be used, as spread and controls are likely to be similar, for example felling and removal of infested trees and nearby hosts and preventing movement of wood or live trees in surrounding area. The risk caused by this pest does not warrant creation of a separate plan.

Due to most of its lifecycle taking place in tree wood, detection and monitoring would be difficult. This pest produces visible damage e.g. frass and galleries but these can be easily missed or mistaken for native beetles. Additionally, *M. sericeum* larvae and adults are similar to native Lymexylidae beetles and could be easily confused. The adults are nocturnal and attracted to light traps, this method could be used for surveillance (Sanderson & Glenn, 1963).

Some methods have been listed for control, including woodland and plantation hygiene, such as removal of ‘brood trees’ (dead/decaying trees and logs that may act as a reservoir) (Craighead, 1950). Other methods involve the preventing of fires or other causes of lesions/wounds that could be used as oviposition sites (Solomon, 1995). Previously, in exceptional cases when infestation is severe, fumigation sprays have been used but information is limited (Craighead, 1950). Furthermore, as treatments would have been used in the early 1900s, sprays used for this pest would now be considered outdated and unfit for use in the UK.

18. References

Blatchley WS (1910) *An Illustrated Descriptive Catalogue of the Coleoptera Or Beetles (exclusive of the Rhynchophora) Known to Occur in Indiana: With Bibliography and Description of New Species*. Nature Publishing Companypp.

Brewer LG (1995): Ecology of Survival and Recovery from Blight in American Chestnut Trees (Castanea dentata (Marsh.) Borkh.) in Michigan. *Bulletin of the Torrey Botanical Club* **122** (1), 40-57.

Buttrick PL (1999): Commericial Uses of Chestnut. *Journal of American Chestnut Foundation* **Volume XIII, Number 1** 25.

Craighead FC (1950) *Insect Enemies of Eastern Forests*. U.S. Government Printing Officepp.

Entomological Society of Ontario (1895) *Annual report*. The Society, Torontopp.

Forest Research (2022) Forestry Statistics 2022, Chapter 3: Trade, https://www.forestresearch.gov.uk/tools-and-resources/statistics/forestry-statistics/.

Forest Research (2024) Sweet chestnut blight (Cryphonectria parasitica). Available at: https://www.forestresearch.gov.uk/tools-and-resources/fthr/pest-and-disease-resources/sweet-chestnut-blight-cryphonectria-parasitica/ (accessed 28/08/2024).

Hopkins AD (1903) *Insect injuries to hardwood forest trees*. US Government Printing Office, Washingtonpp.

Hopkins AD (1910) *Some insects injurious to forests*. United States Department of Agriculture, Bureau of Entomology. US Government Printing Office, Washingtonpp.

Howard LO (1895) *Insect life Vol VII*. Government Printing Office, Washington, D.Cpp.

JKI, Baufeld P, Hoppe B, Schrader G & Vogt-Arndt E (2018) Express PRA for Melittomma sericeum. Julius Kuehn-Institute, Institute for National and International Plant Health.

Missouri Botanical Gardens (2024) Castanea sativa - Plant Finder. Available at: https://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=280759#:~:text=Castanea%20sativa%2C%20commonly%20called%20Spanish,much%20as%207%27%20in%20diameter (accessed 03/06/24).

Packard AS (1869) *Guide to the study of insects, and a treatise on those injurious and beneficial to crops: for the use of colleges, farm schools, and agriculturists*. Naturalist's book agency; [etc.,etc.], Salempp.

Sanderson MW & Glenn MO (1963): Note on Behavior and Distribution of Melittoma Sericeum Harris (Coleoptera: Lymexylonidae). *The Coleopterists Bulletin* **17** (2), 52-52.

Solomon JD (1995) *Guide to insect borers in North American broadleaf trees and shrubs*. US Department of Agriculture, Forest Service, 290-292 pp.

Toki W (2023): Fungal community of mycetangia in the ship-timber beetle Elateroides dermestoides (Coleoptera: Lymexylidae) in Japan. *Symbiosis* **89** (3), 299-305.

ukbeetles.co.uk Elateroides dermestoides (Linnaeus, 1761). Available at: https://www.ukbeetles.co.uk/elateroides-dermestoides.

Ulyshen M (2016): Wood decomposition as influenced by invertebrates. *Biological Reviews* **91** 70-85.

Wheeler QD (1986): Revision of the genera of Lymexylidae (Coleoptera, Cucujiformia). Bulletin of the AMNH; v. 183, article 2. 121-122, 171-177.

Name of Pest Risk Analysts(s)

Alex Linay (Defra)

This publication is available via the UK Plant Health Information portal https://planthealthportal.defra.gov.uk/

This PRA has been undertaken following IPPC International Standards for Phytosanitary Measures (ISPMs 2 and 11) and it provides technical evidence relating to the risk assessment and risk management of this pest.

This 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 on 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.

Any enquiries regarding this publication should be sent to us at

The Chief Plant Health Officer

Department for Environment, Food and Rural Affairs

Room 11G32

Sand Hutton

York

YO41 1LZ

Email: plantpestsrisks@defra.gov.uk

Appendix

Table 1A UK imports of cut branches and other parts of plants (CN 06042090)		
	Weight in tonnes (t), split by country	
Year	**Canada**	**United States**
2019	0	58.9
2020	0	21.3
2021	0	7.0
2022	0	0.1
2023	0	0.5

Table 2A UK imports of other genera spp. wood (CN: 44079927, 44079990)		
	Weight in tonnes (t), split by country	
Year	**Canada**	**United States**
2019	1699.3	8399.4
2020	1659.4	8677.2
2021	816.4	8951.7
2022	510.4	7969.5
2023	462.4	8165.0