The Food & Environment Research Agency

# Rapid Pest Risk Analysis for

# *Trichoferus campestris*

*This document provides a rapid assessment of the risks posed by the pest to the UK in order to assist Risk Managers decide on a response to a new or revised pest threat. It does not constitute a detailed Pest Risk Analysis (PRA) but includes advice on whether it would be helpful to develop such a PRA and, if so, whether the PRA area should be the UK or the EU and whether to use the UK or the EPPO PRA scheme.*

## STAGE 1: INITIATION

**1.What is the name of the pest?**
*Trichoferus campestris* (Faldermann, 1835) Coleoptera: Cerambycidae

*Trichoferus campestris* (Faldermann) is a member of the taxonomically poorly understood *Trichoferus* Wollaston - *Hesperophanes* Dejean complex (Grebennikov *et al*. 2010). Much of the literature uses the synonym *Hesperophanes campestris* (Faldermann, 1835).

Common names: Mulberry longhorn beetle
Velvet longhorned beetle (US)
Chinese longhorn beetle (US, Australia)

**2. What is the pest's status in the EC Plant Health Directive (Council Directive 2000/29/EC[1]) and in the lists of EPPO[2]?**
This pest is not listed in the EC Plant Health Directive.

The pest was added (as *Hesperophanes campestris*) to the EPPO A2 list of pests recommended for regulation as a quarantine pest by EPPO in 2007 (EPPO, PQR 2013). (A2 list due to its presence in EPPO members Russia, Kazakhstan, Kyrgyzstan and Uzbekistan).

An early USDA risk assessment of wood boring beetles (Cavey, 1998) included *Trichoferus* (*Hesperophanes*) *campestris*; the assessment concluded that it presented a high risk to the USA due to its frequent interception, occurrence in temperate regions, wide host range of ornamental deciduous trees and ability to disperse by flying.

**3. What is the reason for the rapid assessment?**
In June 2013, a *Trichoferus* sp.*,* strongly suspected to be *T. campestris,* was found having emerged from a wooden cutlery tray imported from China. When information regarding this organism was input to the UK plant health risk register (phase 1, summer 2013), the mitigated UK relative risk rating placed the organism amongst the highest ranking threats and it was consequently identified as a priority for further study - hence this rapid assessment.

[1] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2000L0029:20100113:EN:PDF
[2] http://archives.eppo.int/EPPOStandards/PM1_GENERAL/pm1-02(21)_A1A2_2012.pdf

## STAGE 2: RISK ASSESSMENT

**4. What is the pest's present geographical distribution?**

*Trichoferus (Hesperophanes) campestris* is native to Asia and Russia. EPPO PQR (2013) reports its distribution as China, Korea (North & South), Japan, Kazakhstan, Kyrgyzstan, Mongolia, Russia (Eastern Siberia, Far East, European Russia), Tajikistan and Uzbekistan.

Historically, this species has been found inside North American warehouses associated with imported wooden pallets, wire spools, crates and such like (Anon., 2013; Allen & Humble, 2002). There have been North American findings not associated with warehouses (e.g. Grebennikov *et al*. 2010) but it is still not clear whether such reports result from finds of adults emerging from wood material imported from Asia or are adults from established North American populations. Significant numbers have been collected in Utah, USA (408 in 2014) indicating establishment has occurred in this US state with a distribution from Salk Lake county to Central Utah county (Burfitt *et al.* 2014). It was found to be infesting a street tree in Ontario, Canada and though this tree was removed, it could indicate a local population has established (Bullas-Appleton *et al.* 2014).

Sabol (2009) describes *Trichoferus campestris* as an invasive and rapidly spreading species also reported from Georgia, India, Iraq, Iran, Israel, Jordan, Lebanon, Syria, Turkey, Turkmenia, and in northwest Africa (Egypt, Sinai Peninsula) and from Europe (Moldova, Romania, south eastern and central part of European Russia, Ukraine). However, the literature referred to by Sabol has not been checked and reports for some countries may be interception records rather than reports of finding established populations. For example, Sabol (2009) reports *Trichoferus campestris* from the Czech Republic although the records result from finds on wooden pallets imported from Russia and birch firewood, which could also have been imported. Nevertheless, one of the CZ finds did come from an uprooted *Gleditsia triacanthos* (honey locust tree). A finding in Slovakia reported by Sabol (2009) was not associated with a growing plant but found at an illuminated surface.

Recent literature by Dascalu *et al*. (2013) confirms *T. campestris* has established outdoors in natural areas within the EU (Romania, Hungary, Poland) having likely spread westwards from Russia both naturally and in wooden items such as Wood Packaging Material (WPM) or finished products.

**5. Is the pest established or transient, or suspected to be established/transient in the UK?**

*Trichoferus campestris* is not suspected to be established in the UK. There has been one suspect finding associated with an adult emerging from a wooden cutlery tray imported from China (see 3. above).

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

Grebennikov *et al*. (2010) report and cite literature indicating *Trichoferus campestris* has a broad host range with about 40 genera of woody conifers and deciduous trees and concluded that the species could potentially attack most woody plants. USDA (2006) report the larvae are very tolerant of dry conditions and often infest dead wood as well as live wood.

An EPPO data sheet (EPPO, 2009) reports *T. campestris* preferentially attacks *Malus* (apple) and *Morus* (mulberry), but has also been recorded on *Betula*, *Broussonetia* (an Asian Genera in the family Moraceae), *Gleditsia*, *Salix*, *Sorbus* and various other fruit and deciduous trees. USDA (2006) also report *Ulmus* and *Populus* as important hosts, as did a checklist of hosts in Korea which additionally included *Fraxinus* and *Robinia pseudoacacia* (Lim *et al.*, 2014). In Canada, live larvae were found infesting *Acer platanoides* (Norway maple) indicating this is also suitable as a breeding host (Bullas-Appleton *et al.*, 2014).

*Trichoferus campestris* may also attack cut wood of *Picea* and *Pinus* and structural timbers in buildings (EPPO, 2009). Dascalu *et al*. (2013) report a record of adult *T. campestris* having emerged from the wooden rafters of a house in Craiova (Romania) in 2006. A paper on the pest in Utah indicated that *Pinus* and *Picea* were also attacked as living hosts (Burfitt *et al*., 2014).

Many of the hosts of *T. campestris* are of economic and environmental importance to the UK. *Malus,* recorded as one of the preferred hosts, is grown commercially for apple production, and *M. sylvestris* is found widely in broadleaved woodlands and as a constituent of hedgerows. The genus *Sorbus* includes several species that are endemic to the UK (Rich and Houston, 2006). Given the wide host range the pest has demonstrated, many other native broadleaved trees in the UK may be susceptible to attack by *T. campestris*.

**7. If the pest needs a vector, is it present in the UK?**
This is a free living organism, no vector is required.

**8. What are the pathways on which the pest is likely to move and how likely is the pest to enter the UK** *(in the next 5 years)***?**

Interception data and reports in literature provide evidence showing *T. campestris* has been associated with wood packing material (WPM) and "finished" wooden products from Asia (mainly China). Hence we assume the most likely pathways into the UK are via such material.

Between 1997 and 2012 the organism was intercepted at least ten times in Canada, always associated with wood in some form or other (e.g. wooden reels, crates, pallets, wooden garden bench, or un-described wood) imported from Asia, and mainly from China (e.g. CFIA, 2014, Unpublished interception records). There have been many interceptions in the US (Anon., 2013).

Cocquempot (2006) reported about ten *T. campestris* emerging from *Salix* timber in France (Marseilles) in June 2002; the timber having been imported from China the previous summer (August, 2001). As noted above, Sabol (2009) reported *T. campestris* emerging from Russian pallets in the Czech Republic.

Fera diagnosticians provided diagnostic advice to Swedish plant health authorities following an interception of this beetle by Sweden within non-living plant material (a woven basket) from China in December 2005 (J. Ostojá-Starzewski, pers. comm., 2014).

Given the history of interceptions of this pest in association with timber, WPM and finished wooden products, entry on this pathway is considered moderately likely. The correct application of ISPM 15, a treatment of WPM designed to eliminate the risk of pests spreading along this pathway, would help mitigate the risk of entry of *T. campestris* on WPM. However it should be noted that the pest is continuing to spread in the EU, and WPM being moved internally does not have to be ISPM15 compliant. Thus if the pest continues to spread in the EU, the likelihood of entry on these pathways will increase.

EPPO PQR (2013) and an EPPO datasheet (EPPO 2009) also consider plants for planting such as bonsai and larger host plants moving in trade as possible pathways. However, there are no data to support this at present, it was noted that in Utah it preferred trees that were medium to large sized (Burfitt *et al.* 2014), and these are unlikely to be moved in trade.

<u>Natural spread</u>
Dascalu *et al*., (2013) provide a map of Central and Eastern Europe showing the locations of published records, previously unpublished finds and interception reports and suggest *T.*

*campestris* may be more widespread than realised in Eastern Europe. This is due to the fact that beetles are only active at night, meaning they are rarely seen, and the pest has been misidentified for other species of *Trichoferus* in the past. Natural spread from Eastern Europe is possible but judged unlikely within the next five year time horizon (to 2019).

*Judgments by pathway*:

| | Very unlikely | Unlikely | Moderately likely | Likely | Very likely |
|---|---|---|---|---|---|
| WPM and timber: | | | ✓ | | |
| Finished wooden items: | | | ✓ | | |
| Natural spread: | | ✓ | | | |

**9. How likely is the pest to establish outdoors or under protection in the UK?**
Potential hosts are widely available across much of the UK. The thermal requirements for development are not known. Literature reports suggest development can take place in one or two years (similar to *Anoplophora glabripennis*). Given this is a rapid assessment, and taking current distribution into account, it is assumed that it is moderately likely to likely that *T. campestris* could establish in the UK were it to enter and transfer to a host. It is currently present in regions with colder winters than the UK, meaning winter temperatures are not expected to limit establishment, however summers are warmer which may affect the ability of the pest to complete its lifecycle.

Hosts are not generally grown under protection and *T, campestris* is not recorded as a pest of protected cultivation, so establish under protection is rated as very unlikely with high confidence.

| | Very unlikely | Unlikely | Moderately likely | Likely | Very likely |
|---|---|---|---|---|---|
| Outdoors: | | | ✓ | ✓ | |
| Under protection: | ✓ | | | | |

**10. How quickly could the pest spread in the UK?**
Adults can fly although no data regarding dispersal distances were noted in available literature. It is difficult to judge if all movement in Eastern Europe has been by natural spread, or if some populations represent new introduction events. Natural spread is rated as slowly, though with high uncertainty due to a lack of data on the flight capacity of the pest. If *T. campestris* were to become a pest in forestry stands, then it could spread very quickly in movement of infested timber or other wooden products.

| | Very slowly | Slowly | Moderate pace | Quickly | Very quickly |
|---|---|---|---|---|---|
| Natural spread: | | ✓ | | | |
| In trade: | | | | | ✓ |

**11. What is the area endangered[3] by the pest?**
This rapid assessment adopts a precautionary approach and assumes that broadleaved trees, particularly those in the south west and south east of England where climatic conditions may allow for a shorter lifecycle of the pest, could suffer economic and environmental impacts. Orchards where the preferred *Malus* hosts are grown are at particular risk since some yield loss has been noted where it is invasive in Utah.

[3] Endangered area = An area where ecological factors favour the establishment of a pest whose presence in the area will result in economically important loss.

**12. What is the pest's economic, environmental or social impact within its existing distribution?**

Of the available literature reviewed for this rapid assessment, none suggest *T. campestris* is a serious pest in Asia. EPPO (2009) notes that the importance of *T. campestris* as a damaging pest of orchard trees, amenity trees, forest trees or trees in natural environments does not appear to have been evaluated in any detail, perhaps suggesting impact is not significant, although preferred hosts are known (*Malus* and *Morus*). There are no reports of impacts where the pest has been introduced within the EU.

*T. campestris* adults emerged and live *T. campestris* were found within logs collected by the Canadian Food and Inspection Agency from a dying Norway maple, *Acer platanoides* in Middissauga, Ontario, Canada. An examination of the feeding damage caused by *T. campestris* suggested that *T. campestris* is not a primary pest of trees in Ontario (Bullas Appleton *et al.,* 2013). In Utah damage has been noted on a range of medium to large trees, with infested trees showing thinning crowns and epicornic shoots (Burfitt *et al.* 2014). In Utah infestation by *T. campestris* is not thought to cause rapid tree death but can impact on fruit yield, wood marketability and tree longevity (Spears and Remirez, 2014).

As a consequence of the disparity of data on the impacts of these species, there is high uncertainty associated with the rating. Impacts in the current range are rated as very small to medium.

| Very small | Small | Medium | Large | Very large |
|---|---|---|---|---|
| ✓ | ✓ | ✓ | | |

**13. What is the pest's potential to cause economic, environmental or social impacts in the UK?**

Whilst perhaps not a major pest within its native range (e.g. due to co-evolution of hosts developing defence mechanisms, and the presence of natural enemies), lack of impact within its native range need not suggest low impacts can necessarily be expected were the pest to establish in the UK, it is possible that *T. campestris* could have a more significant impact in the UK. Unlike in other areas of the EU where *T. campestris* has spread, there are no native *Trichoferus* species in the UK (Duff, 2012). With hosts available amongst orchard trees, amenity trees, forest trees and trees in the natural environment, damage could be widespread were the pest to establish and loss of vigour amongst orchard crops would reduce yields. Impacts are rated as small to medium, with high uncertainty. Introduction may result in only very small impacts, such as those seen where it has spread within the EU, or could lead to decline of trees as seen in North America.

| Very small | Small | Medium | Large | Very large |
|---|---|---|---|---|
| | ✓ | ✓ | | |

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

*Trichoferus campestris* is not known to vector plant pathogens, although wounds to trees caused by the adults and larvae could provide access for secondary pathogens.

## STAGE 3: PEST RISK MANAGEMENT

### 15. What are the risk management options for the UK?

Exclusion: Exclusion of the pest in wood packaging material is dependent upon the full implementation of ISPM 15, the international standard for wood packaging. An information campaign with importers might reduce the risk of further wooden products arriving with the pest, however some of the import trade is via websites (that are difficult to regulate) and more disparate and harder to engage with than traditional high street retailers. Random inspections of finished wooden products would help to evaluate the likelihood of importing *T. campestris,* and other pests, on and in such materials.

Eradication / Containment: If there was an outbreak of this pest in the UK, it might go undetected for many years in which case the extent of establishment may be so wide that eradication was not practical / justifiable given the possible lower threat the pest appears to present. Removal of infested or potentially infested trees would be the most effective eradiation and containment measure, however, the extensive host range of the beetle might make this a very damaging or disruptive measure.

Non-statutory controls: If the beetle became established in the UK, some degree of control is likely from the application of insecticides to trees to control other pests. However, systemic methods would be required to tackle given larvae.

### 16. Summary and conclusion of rapid assessment.

This is an Asian cerambycid, capable of feeding on many tree species, that is moving internationally associated with wooden packaging material and finished wooden products. Interceptions continue with SWPM despite ISPM 15 officially being applied in China and Russia. The pest appears to have spread westwards through Russia into Europe and the EU. More detailed information on the biology of the pest and the impacts it is having in North America and Eastern Europe would be of great help in refining this rapid assessment.

This rapid assessment shows:

| | Very low | Low | Moderate | High | Very high |
|---|---|---|---|---|---|
| Likelihood of entry | | | ✓ | | |
| Likelihood of establishment | | | ✓ | ✓ | |
| *Economic impact* | | ✓ | ✓ | | |
| *Endangered area* | Ornamental trees and especially apple orchards in warmer parts of UK | | | | |
| *Risk management* | Seek to exclude, encourage EU listing, eradicate if appropriate when outbreak detected. | | | | |

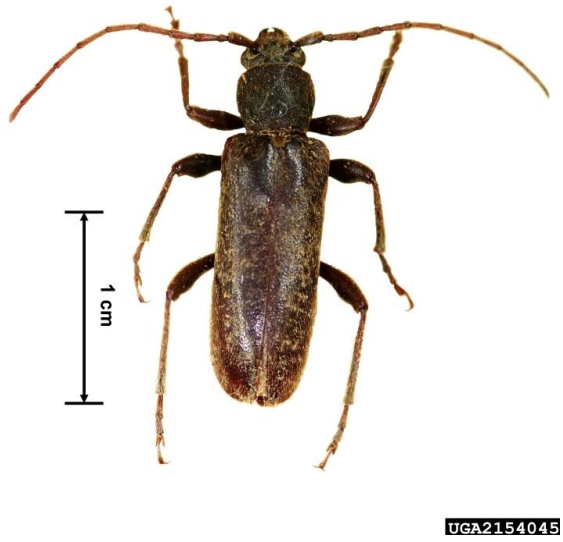
## 17. Is there a need for a detailed PRA? If yes, select the PRA area (UK or EU) and the PRA scheme (UK or EPPO) to be used.

This pest is already recommended for regulation as a quarantine pest by EPPO. The UK supports further assessment at EPPO level.

| | |
|---|---|
| No | ✓ |

| | | | | | |
|---|---|---|---|---|---|
| Yes | | PRA area:<br>UK or EU | | PRA scheme:<br>UK or EPPO | |

## 18. IMAGES OF PEST




USDA APHIS PPQ

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

| | | | |
|---|---|---|---|
| Yes<br>Statutory action | ✓ | No<br>Statutory action | |

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