

Rapid assessment of the need for a detailed Pest Risk Analysis for *Oemona hirta*, the lemon-tree borer

Disclaimer: 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?

Oemona hirta (Fabricius) (Coleoptera: Cerambycidae) the lemon-tree borer

The genus *Oemona* was revised in 2005. Phylogenetic analysis suggests the genus be divided into two species groups, the “hirta-group” and the “separata-group” (Wen & Wang, 2005).

2. What is the pest’s status in the EC Plant Health Directive (Council Directive 2000/29/EC) and in the lists of EPPO?

Oemona hirta is not listed in the EC PH Directive or any EPPO lists, i.e. the A1 and A2 Lists of pests recommended for regulation as quarantine pests; the EPPO Alert List or the EPPO Action List (<http://www.eppo.org/QUARANTINE/quarantine.htm>)

3. What is the reason for the rapid assessment?

This highly polyphagous longhorn beetle was intercepted as larvae inside *Wisteria* rootstock at a nursery in the Midlands in June 2010. Although the nursery destroyed the plants, eight other consignments of host material given phytosanitary certificates by the NZ authorities at the the same supplier in New Zealand between 4th and 5th June 2010 have subsequently been delivered to UK nurseries.

STAGE 2: RISK ASSESSMENT

4. What is the pest’s present geographical distribution?

Oemona hirta is a native of New Zealand and is found throughout the country. The report of *O. hirta* occurring in Malaysia (as reported in the CABI Crop Protection Compendium) is not actually supported by the reference provided by CABI, i.e. APPPC (1987) does not show that *O. hirta* actually occurs in Malaysia.

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

Oemona hirta is not regarded as established or transient in the UK. It has been intercepted once before in UK, in 1983 (Fera, unpublished data). During production of this Rapid Assessment, it became apparent that the PHSI was aware that a nursery in the north of England had burnt four or five *Wisteria* originating from New Zealand which had tunnelling and frass last year (2009). *Oemona hirta* could have been the cause of this damage. If some adults had emerged from infested hosts that were not detected, then there is a chance that

O. hirta could have escaped and have already established, at least in the north of England. *O. hirta* is not reported in the atlas of longhorn beetles of Britain (Twinn & Harding, 1999) or in the more recent checklist of British beetles (Duff, 2008).

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

Oemona hirta is highly polyphagous, feeding on many tree, shrub and vine species. Over 130 host genera are listed in a New Zealand database of herbivores and their hosts (Plant Synz, accessed 10th June 2010). Larvae bore into the wood, branches and stems, adults feed on pollen and nectar (Wang *et al.*, 1998). Although citrus is its major host, and all commercial varieties in New Zealand are susceptible to attack, a range of other hosts are listed below. Some of the many hosts of economic and/or environmental importance in the UK are marked*:

acacia	*gorse (<i>Ulex</i>)	pomegranate (<i>Punica</i>)
*alder (<i>Alnus glutinosa</i>)	*grape (<i>Vitis vinifera</i>)	*poplar (<i>Populus</i> spp.)
almond (<i>Prunus dulcis</i>)	<i>Hakea</i>	*plum (<i>Prunus domestica</i>)
*apples (<i>Malus</i>)	*hawthorn (<i>Crateagus</i> spp.)	*oak (<i>Quercus</i>)
*birch (<i>Betula</i>)	*horse-chestnut	*pine (<i>Pinus</i> spp.)
*blueberry (<i>Vaccinium</i>)	(<i>Aesculus hippocastanum</i>)	*rose (<i>Rosa</i> sp. cultivated)
*cherry (<i>Prunus avium</i>)	<i>Macadamia</i>	*Sycamore (<i>Acer pseudoplatanus</i>)
*citrus (<i>Citrus</i> spp)	mahoe (<i>Meltyctus</i>)	Tamarillo /tree tomato
*elms (<i>Ulmus</i>)	peach (<i>Prunus persica</i>)	(<i>Solanum betaceum</i>)
*fig (<i>Ficus</i>)	*pear (<i>Pyrus</i>)	*walnut (<i>Juglans</i> spp.).
*gooseberry (<i>Ribes grosularia</i>)	*plane tree (<i>Platanus</i>)	*Wisteria

(Clearwater, 2010; Plant SyNZ, 2010; Wang *et al.*, 1998).

In New Zealand *O. hirta* has been reported as a pest on *Wisteria* in the gardening press (Waikato Times, 2009).

7. If the pest needs a vector, is it present in the UK?

Oemona hirta 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?

Oemona hirta could not reach the UK naturally from New Zealand or Malaysia. It's entry to the UK would most likely be facilitated via trade (imports) of infested host plants for planting, as in 1983 and 2010. It is assumed that *O. hirta* host plants are regularly imported from New Zealand as plants for planting. Such a commodity type from Third Countries require inspection by PHSI yet only two interceptions of *O. hirta* have been recorded in the UK over a 27 year period (1983 – 2010). Thus, although it is clearly possible for *O. hirta* to enter the UK, it is very difficult to detect and with only two records, appears to be a rare event and thus judged to be unlikely. However, there is great uncertainty around this judgment.

Host plants	Very		Unlikely	X	Moderately		Likely		Very	
for planting:	unlikely				likely				likely	

9. How likely is the pest to establish outdoors or under protection in the UK?

Like most plant pests which cannot regulate their body temperature, the likelihood of establishment of *Oemona hirta* in the UK will largely be determined by the availability of host plants and the climate.

- (i) Hosts: As noted in 6. above, host plants are widely available in the UK and given that the beetle has arrived with host plants for planting, locating suitable hosts will not be difficult for adults that emerge.
- (ii) Climate: *Oemona hirta* occurs throughout New Zealand, a country with a largely temperate climate (temperate oceanic) much like the UK. The Koppen-Geiger climate classification system puts both the UK and New Zealand within the category “Cbf” (warmer humid climates, temperate, constantly moist with rainfall thought the year), indicating a good degree in climate similarity.

Taking host and climate factors into account, it is likely that *O. hirta* could establish outdoors in the UK. It could also survive under protection although most hosts will not be grown in such a situation.

Outdoors:	Very unlikely	<input type="checkbox"/>	Unlikely	<input type="checkbox"/>	Moderately likely	<input type="checkbox"/>	Likely	<input checked="" type="checkbox"/>	Very likely	<input type="checkbox"/>
Under protection:		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>		<input type="checkbox"/>

Focusing on *Wisteria*, the host that interceptions have been found on, *Wisteria* are generally planted against south-facing house facades (walls). Both the southerly aspect and the walls will help keep temperatures from dropping low in winter and staying high in the summer, probably benefitting any *O. hirta* larvae developing within stems.

10. How quickly could the pest spread in the UK?

The rate of spread of cerambycids through natural dispersal varies according to the host within which larvae develop (Hanks, 1999). Natural spread could be in the order of a few kilometres per year. However, when transported within infested plants, the eggs, larvae or pupae of *O. hirta* could be spread via trade to any part of the UK within a day or two.

Natural spread:	Very slowly	<input type="checkbox"/>	Slowly	<input checked="" type="checkbox"/>	Moderate pace	<input type="checkbox"/>	Quickly	<input type="checkbox"/>	Very quickly	<input type="checkbox"/>
In trade:	Very slowly	<input type="checkbox"/>	Slowly	<input type="checkbox"/>	Moderate pace	<input type="checkbox"/>	Quickly	<input type="checkbox"/>	Very quickly	<input checked="" type="checkbox"/>

11. What is the area endangered by the pest?

The south east of England is the area with most hardy ornamental nurseries, hence is assumed to be the area most likely to receive imported ornamental plants from New Zealand, although the current interception was made in the West Midlands (Fera, unpublished records). The south east region is also the area of England with most woodland (MacLeod, 2008) suggesting this is the region where the polyphagous beetle is most likely to locate a host. In addition the climate of the south east is generally warmer than elsewhere in the UK and hence is the region where the life cycle would be completed in the shortest time. For these reasons the south east of England is considered the most endangered area of the UK although *O. hirta* does present a risk to all parts of the UK.

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

Female *O. hirta* can lay over 50 eggs (Wang *et al.* 1998). Just one, or a few larvae can kill or severely weaken branches of trees and vines or may kill whole trees and vines once they enter the trunk. In New Zealand, Prof. Qiao Wang has studied *O. hirta* for several years and published at least five papers on its biology¹. He considers it is “of great economic importance since all commercial citrus varieties are attacked” (Wang *et al.*, 2002). However, his judgment must be put into perspective against pests with greater and more immediate economic impacts. Although best known as a serious pest of citrus trees, *O. hirta* also

¹ http://plant-protection.massey.ac.nz/the_team/Q_Wang/index.htm

causes damage to other top fruit and some soft fruit (e.g. blueberry) crops. Ornamental trees and shrubs are also attacked. Forestry crops (*Populus*) can also be damaged (Hosking, 1978).

Economic:	Very small	<input type="checkbox"/>	Small	<input type="checkbox"/>	Medium	<input checked="" type="checkbox"/>	Large	<input type="checkbox"/>	Very large	<input type="checkbox"/>
Environmental:	Very small	<input type="checkbox"/>	Small	<input type="checkbox"/>	Medium	<input checked="" type="checkbox"/>	Large	<input type="checkbox"/>	Very large	<input type="checkbox"/>
Social:	Very small	<input checked="" type="checkbox"/>	Small	<input type="checkbox"/>	Medium	<input type="checkbox"/>	Large	<input type="checkbox"/>	Very Large	<input type="checkbox"/>

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

In the UK *Citrus* is not a commercial fruit crop although it has value as an ornamental. Top fruit and trees such as elms are potentially at risk.

Economic:	Very small	<input type="checkbox"/>	Small	<input type="checkbox"/>	Medium	<input checked="" type="checkbox"/>	Large	<input type="checkbox"/>	Very large	<input type="checkbox"/>
Environmental:	Very small	<input type="checkbox"/>	Small	<input type="checkbox"/>	Medium	<input checked="" type="checkbox"/>	Large	<input type="checkbox"/>	Very large	<input type="checkbox"/>
Social:	Very small	<input checked="" type="checkbox"/>	Small	<input type="checkbox"/>	Medium	<input type="checkbox"/>	Large	<input type="checkbox"/>	Very large	<input type="checkbox"/>

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

Oemona hirta is not known as a vector of plant pathogens.

STAGE 3: PEST RISK MANAGEMENT

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

Action for keeping the pest out of the UK

Oemona hirta could be added the EPPO Alert List to make EPPO members aware of the risk. It could also be proposed for listing in Annex 1A1 of the Plant Health Directive. As the pest is indigenous and present in the whole of New Zealand, a requirement for host trees from New Zealand to be grown in pest free areas is unlikely to be effective. However, requiring host trees to be grown within nurseries with physical protection against the pest (as per one of the options for *Acers* from China in the emergency measures for *Anoplophora chinensis* (2008/840/EC) is another option. On arrival in the EU, destructive sampling would provide some level of confidence that consignments are pest free, but the level of detection is a function of the sample sizes. In addition, a requirement for host material to be held within glasshouses for at least one year (i.e. post-import) would provide another means of ensuring that hosts are pest free before they are distributed around the country.

Options for control if the pest became established

Control of this pest is considered to be very difficult (Wang & Davis, 2005). There is no chemical specifically registered for borer control in the UK, and the availability of any potential control measures will depend upon whether the pest is detected on a commercial plantation of trees or shrubs (where crop protection chemicals could be used) or a private garden (where only Home & Garden products can be employed). According to Wang & Shi (1999), once larvae enter branches and trunks, chemical control becomes impractical, which severely limits options for treatments and clearly puts the emphasis on destruction of any infested host plants.

Advice from New Zealand on controlling this pest (Hosking, 1978) suggests that affected branches should be cut back and the infested material burnt, since *O. hirta* larvae may be able to complete their development and reach adulthood in pruned twigs left lying on the ground (Muggleston, 1992); the cut ends should also be painted to prevent re-infestation if this is a risk.

In the past, kerosene and petrol were poured into the tunnels (this is however not recommended), and larvae were also physically removed using skewers of thin wire.

An option exists to inject an insecticide solution into the small round, so-called bore-dust ejection holes which are created by the larvae every few centimetres, although this approach might also damage the plant. Products, such as an aerosol can spray of permethrin (No borer spray injector. <http://kiwicare.co.nz>) are available in NZ specifically for borer control; however, this product and permethrin in general are not available for agricultural uses in the UK. It is recommended that any exit holes are sealed up (using paint?) after treatment.

A long-term method of control could be to apply a systemic insecticide such as imidacloprid, which is available for use in amenity vegetation (SOLA 20080298 CHECK), to the soil. In NZ, an organic insecticide (azadirachtin) is used: Neem Tree Granules are sprinkled under lemon trees to control *O. hirta*. Wrapping felt pad soaked in Neem Tree Oil around base of trunk or affected branches is also employed. This product is not registered in the UK.

The only recorded insect parasite is a native NZ ichneumonid wasp, *Xanthocryptus novozealandicus* (Wang & Shi, 1999). There is some anecdotal evidence to suggest that entomopathogenic nematodes might be effective (Wouts & Clearwater, 1980). A suspension of infective juvenile *Neoaplectana feltiae* was injected into infected branches via exposed tunnel ends or open frass holes, but the efficacy was not assessed systematically.

In conclusion, whilst there may be scope for utilising existing insecticides for controlling larvae by pouring or injecting solutions into tunnels, the most effective means of control must be destruction of infested branches, or the whole tree.

16. Summary and conclusion of rapid assessment.

This rapid assessment shows:

Likelihood of entry is: unlikely with high uncertainty. We assume there have been extensive imports of hosts' plants from New Zealand over many years, but there are only two confirmed cases where *O. hirta* is known to have arrived in UK from New Zealand (1x 1983, 1x 2010). The evidence suggests that this is a rare event. However, like other internal feeders, *O. hirta* is difficult to detect and this does not mean that *O. hirta* has not already arrived, escaped detection and established. A rigorous national survey would help determine if this beetle had already established in the UK.

Likelihood of establishment is: likely with low uncertainty. The climate of New Zealand and UK is very similar. Hosts are available in UK. In New Zealand *O. hirta* can cause serious damage to species native to Britain.

Economic impact is expected to be: medium with moderate uncertainty. In the UK, the main host, *Citrus*, is not a commercial fruit crop although it has value as an ornamental. Forestry (hardwood and softwood) and amenity trees, in addition to top fruit and ornamentals are at risk.

Endangered area: the south east of England is considered the most endangered area of the UK although *O. hirta* does present a risk to all parts of the UK.

Risk management: cerambycid beetles are difficult to detect. Once detected the most effective means of control is through the destruction of infested trees.

17. Is there a need for a detailed PRA?

This beetle clearly presents a plant health risk, not only to forestry and amenity trees but also to commercial fruit crops and ornamental shrubs in UK and particularly to *Citrus* producing countries in the southern EU. If this pest is to become regulated a pest risk analysis will be required by the European Commission hence a detailed PRA is required.

Yes ☒ No ☐

If yes, select the PRA area (UK or EU) and the PRA scheme (UK or EPPO) to be used.

If this pest is to become regulated across the EU an EU wide PRA will be necessary. However, it is unclear what the European Commission mean precisely mean by an EU-wide PRA.

PRA area: UK or EU?

PRA scheme: UK or EPPO?

IMAGES OF PEST



<http://www.landcareresearch.co.nz/research/biosystematics/invertebrates/invertid/images/LemontreeBorer1.jpg>

Fig 1: *Oemona hirta* adult (15-25mm long, excluding antennae)



<http://www.nzffa.org.nz/images/design/Pests/Oemona-hirta/Oemona-hirta.html>

Fig 2: *Oemona hirta* larva (25-40mm)

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