

National regulatory control systems
Systèmes de lutte nationaux réglementaires**PM 9/16 (1) *Anoplophora chinensis*: procedures for official control****Specific scope**

This standard describes the procedures for official control with the aim of containing and eradicating *Anoplophora chinensis*.

Specific approval and amendment

First approved in 2013-09.

Introduction

Anoplophora chinensis (including *A. chinensis* form *malasiaca*), the citrus longhorn beetle (EPPO Code: ANOLCN), is on the EPPO A2 List of pests recommended for regulation. It is native to China, the Democratic People's Republic of Korea, Japan and the Republic of Korea. *A. chinensis* is highly polyphagous with hosts in over 70 genera of plants (Lingafelter & Hoebeke, 2002). Important woody hosts include *Acer* spp., *Aesculus hippocastanum*, *Citrus* spp., *Cornus* spp., *Corylus* spp., *Cotoneaster* spp., *Crataegus* spp., *Cryptomeria japonica*, *Fagus* spp., *Ficus* spp., *Hibiscus* spp., *Lagerstroemia* spp., *Mallotus* spp., *Malus* spp., *Platanus* spp., *Populus* spp., *Prunus* spp., *Pyrus* spp., *Salix* spp., *Rosa* spp., and *Ulmus* spp., (Gressitt, 1951; Anonymous, 1986; Van der Gaag *et al.*, 2010; EU, 2012). Many of these hosts are widely distributed in the EPPO region. For a fuller host plant list and pest preferences, see Appendix 3.

In Asia, *A. chinensis* is an important pest of citrus orchards (Smith *et al.*, 1997). Trees are weakened by larval attack and are often seriously damaged and sometimes killed. Damage to small, young trees tends to be most severe (Kojima & Hayashi, 1974; Lieu, 1945). The adults can also cause damage by feeding on leaves, petioles and bark. Damage to ornamental and fruit trees in particular may result in important economic losses.

The life cycle of *A. chinensis* takes 1 or 2 years in its native range, and can take 3 years or more in cooler climates of Northern Europe (Maspero, 2007; Van der Gaag *et al.*, 2008). The feeding larvae make galleries in the trunk just under the bark and later enter the woody tissues of the lowest portions of the trunk and roots. Generally, 90% of

the larval population is below ground level (Herard *et al.*, 2006); however, in Italy larval activity has been observed exceptionally up to 4 metres above the ground level in *Platanus* trees (T. Schroeder, pers. comm. 2011). Pupation takes place in the upper part of the feeding area, and the adult longhorn beetles emerge making perfectly round holes, which typically measure 10–15 mm in diameter but can range from 6 to 20 mm (Haack *et al.*, 2010). Evidence of boring may therefore be seen in the form of exit holes and woody debris (frass), which may accumulate around the base of trees. The emerged adults move upward on the trunk, feeding on suckers and tender bark of young shoots (Maspero, 2007).

Natural spread capacity of the insect is generally limited as most adults generally will remain near the tree of emergence and only move very short distances (up to 50 m from the emerging tree) when there are adequate resources. However, a small percentage of adults migrate greater distances and exceptionally could fly a total distance of up to 2 km (Adachi, 1990).

The adults live for approximately 1–3 months, generally between May and August. Single eggs are deposited in small 3–4-mm incisions made in the bark just below the surface. Such incisions usually range from the soil surface level to approximately 60 cm above the ground. These oviposition sites are difficult to observe in the field, but in the case of young plants it can cause a swelling of the stem, which can be visible. Signs of chewing by females when they create egg niches may also be visible.

The insect has demonstrated its capacity to establish in various climatic regions of the EPPO region. Larvae are known to survive temperatures of 0°C for prolonged periods, and outbreaks have occurred in areas where the

minimum winter temperatures are well below zero. The pest is not active at temperatures below 10°C (Adachi, 1994).

Detection of the pest is usually associated with finding live adults or exit holes around the collar of trees. Detection is otherwise difficult, other than by destructive sampling of woody material from ground level.

In the EPPO region, there have been recent detections of *A. chinensis* in several countries. The pest status in these countries at the end of 2012 was as follows: Croatia (pest eradicated), Denmark (transient, under eradication); France (eradicated); Germany (eradicated); Guernsey (no longer present); Italy (present, restricted distribution); Lithuania (no longer present); Netherlands (eradicated); Switzerland (under eradication, no findings); and the United Kingdom (no longer present). The most important pathway for the introduction of *A. chinensis* is the import of host plants for planting from areas where *A. chinensis* is present: in almost all reported cases, detections have been associated with nurseries importing woody host plants for planting, often *Acer* spp. from Asia, particularly China. Imported plants are generally cold stored and then planted in the following spring or summer so the larvae develop into adults from the first to the third year after planting, depending on the summer temperatures and larval developmental stage on arrival. The probability of infestation in plants with small stem diameters (<1 cm) is lower, although inspections performed in Netherlands have demonstrated that larvae can occur in stem diameters of approximately 1 cm (Van der Gaag *et al.*, 2008). There is some uncertainty regarding the stem diameter necessary to support full development into *A. chinensis* adults. Solid wood, including wood packaging material and wood products, is well recognized as a pathway for the closely related species *A. glabripennis*, but is less important for *A. chinensis* due to the larval habits being mainly limited to wood at ground and below-ground levels. Wood of some major host plants of *A. chinensis* (e.g. *Citrus* spp.) is not exported from countries where the pest originates (e.g. China) or used for production of wood packaging material. For details on *A. chinensis* biology see the EPPO datasheet (EPPO, 2013).

Experience in the EPPO region has shown that for successful eradication of *A. chinensis*, early detection and prompt effective action are key factors.

Photos of *A. chinensis* can be viewed in the EPPO Gallery¹.

This Standard describes a national regulatory control system for the monitoring, eradication and containment of *A. chinensis*, and describes:

- elements of a monitoring programme to detect a new infestation or to delimit an infested area
- measures aiming to eradicate recently detected populations (including an incursion)

- containment measures to prevent further spread in a country or to neighbouring countries, in areas where the pest is present and eradication is no longer considered feasible.

The Standard distinguishes two main situations:

- detection of an established population
- detection that can be related to an imported consignment and where, based on the information available, the NPPO has evaluated that successful breeding of the pest has not taken place.

Monitoring of *Anoplophora chinensis*

Surveillance for the presence of *A. chinensis* in a country or area not known to have citrus longhorn beetle is usually based on a detection survey (the method used for the detection survey is described in Appendix 1). The likelihood of detecting *A. chinensis* in a tree is determined by the distribution of *A. chinensis* through the tree. Some 70 eggs per female are laid one-by-one in the bark of the trunk. If a tree has been killed by *A. chinensis* infestation, there is increased likelihood of the pest being present through the whole trunk area. The strategy that gives the highest likelihood of detecting *A. chinensis* in all circumstances is to take samples from lower trunk and below-ground woody material, always including bark with crevasses.

Symptoms that can be used as indicators for sampling include: frass, discoloration and deformation of bark, larval galleries and exit holes. There is currently no method to distinguish visually between trees exhibiting dieback due to *A. chinensis* and those dying for other reasons. It should also be recalled that presence of *A. chinensis* in trees is not immediately associated with wilt symptoms.

If *A. chinensis* is detected, a delimiting survey should be carried out in order to delimit an infested area and establish a regulated area. Methods used for the delimiting survey distinguish two situations: detection of an established population (Appendix 2), and detection that can be related directly to an imported consignment and where, based on the information available, the NPPO has evaluated that successful breeding of the pest has not taken place (see Eradication).

Surveillance should continue in the regulated area until *A. chinensis* is eradicated.

It is also recommended that actions to raise public awareness are undertaken by the NPPO.

Eradication of *A. chinensis*

When a breeding population of *A. chinensis* is detected in tree(s), cutting debris or waste wood, official eradication measures should be taken. Two situations should be distinguished: eradication of an established population, or eradication following a detection that can be related to an imported consignment and where, based on the information

¹<http://photos.eppo.org/index.php/album/51-anoplophora-chinensis-anol-cn>

available, the NPPO has evaluated that successful breeding of the pest has not taken place.

Eradication measures for an established population

When eradication is considered feasible, the process should include five main activities, as follows.

- (1) Surveillance for full distribution of the pest (see Introduction to Appendix 2).
- (2) Measures to prevent spread of the pest, including establishment of an initial regulated area of at least 2 km radius around the infested tree(s) and clear-cut area (see Monitoring of *Anoplophora chinensis* in Appendix 2).
- (3) Control measures to eradicate the pest when it is found associated with plants for planting, standing trees and wood (see Eradication of *Anoplophora chinensis* in Appendix 2), as follows.
 - The infested tree(s) should be felled immediately (or before the next flying period if found outside the flying period) and, together with the cut waste and stumps, destroyed completely by chipping to fragments less than 2.5 cm in any dimensions, preferably *in situ* or by burning. Where this is not possible (e.g. due to high risk of fire), it should be carried out in the nearest appropriate location (avoiding any risks of *A. chinensis* spread to non-infested areas). If it is not possible to remove deeply seated stumps and surface roots, they should be ground to well below (not less than 40 cm below) surface level and/or covered by insect-proof material. If immediate felling is not possible when adults are active, application of insecticides to infested trees to stop further emergence of adults, and possibly to kill adults feeding on the branches, should be considered. An intensive delimiting survey of at least 1 km radius around the positive tree(s) should start immediately. Additional findings of infested trees should result in an extension of the delimiting survey. The radius of the survey will be determined based on the density of host plants in the area.
 - Depending on the results of the delimiting survey, a regulated area for application of eradication measures should be established.
 - For a localized and small infestation, the establishment of a 100-m-radius clear-cut area around the infested tree(s) should be considered.
 - For a wider and more dispersed infestation, the edge of the known infested area should be delimited and a 100 m clear-cut area around the edge should be established.
 - In both cases, the exact radius of the clear-cut area should be determined by the NPPO, depending on the population of the pest and the presence and density of host plants. When a felled tree is found to be infested, then stumps and roots of this tree should be removed and destroyed according to Appendix 2. The stumps of healthy trees could be treated to prevent regrowth.

Felling of host plant species (see Appendix 3) should be carried out from the outside of the area towards the centre. The lower part of the trunk should be examined for signs of pest presence. Representative samples taken from the trees felled in the clear-cut area should be analysed for the presence of *A. chinensis* and to estimate the level of infestation. The exit holes should be sectioned and examined to check their age – this gives an indication of the age of the outbreak. If any infestation is found, a further delimiting survey (as described in step 2 and in Appendix 2) should be carried out and a new clear-cut area established.

- An intensive monitoring area at least 1 km wide around the edge of the clear-cut area should be set up in situations where there are sufficient host trees, and the appropriate regulated area (at least 1 km wide) should be redefined to prevent movement of possibly infested material out of the area. Analysis of the infestation chronology should be used to delimit the extent of the intensive survey area and regulated area.
- (4) Verification of pest eradication: *A. chinensis* can be considered eradicated when the following condition is fulfilled: no findings of *A. chinensis* for two complete life cycles of the pest with a minimum of 4 years of annual monitoring and sampling in the regulated area.
 - (5) Activities to raise public awareness concerning the threat of *A. chinensis* and the measures adopted to prevent its introduction into, and spread within, the country and the EPPO region.

The aim of the measures applied within the regulated area is to eradicate *A. chinensis* and prevent its spread to outside the regulated area, to other areas of the country and to other countries, to limit spread within the regulated area by continually removing foci of infestation. Measures for preventing spread to other areas and for reducing infestation levels are described in Appendix 2.

Eradication measures for plants from an imported consignment where, based on the information available, the NPPO has evaluated that successful breeding of the pest has not taken place.

When *A. chinensis* is found, the following measures should be taken:

- investigations should be conducted regarding the origin of the infested tree and the location of other trees from the same original consignments
- a delimiting survey covering an area of 100 m radius from the location of the infested tree should be carried out to ensure the absence of other infestations, as well as tracing all plants associated with the infestation concerned and examination of them for any sign of infestation; the examination should include targeted destructive sampling
- notification of non-compliance should be sent to the NPPO of the country of origin of the infested plant

(according to ISPM 13 *Guidelines for the notification of non-compliance and emergency action*), and to EPPO

- immediate actions to ensure the prompt eradication of *A. chinensis* and to exclude the possibility of its spread from the infested tree to plants imported in the same consignment of commodity
- any infested plant material should be immediately and completely destroyed.

Containment of *Anoplophora chinensis*

In the case of an established population, when eradication is considered impossible to achieve and containment is more relevant using the following measures:

- Delimit a buffer zone with a radius of at least 2 km beyond the boundary of the infested area where containment measures should be applied.
- Ensure regular surveillance in the buffer zone.
- Ensure containment and suppression measures consisting of the following.
 - (i) Felling of infested plants and plants with symptoms caused by *A. chinensis*. Felling activities should start immediately; however, in cases where the infested plants are found outside the flight period of the pest, felling and removal should be carried out before the start of the next flying period; in exceptional cases where the NPPO concludes that such felling is inappropriate, an alternative containment measure may be applied provided it offers the same level of protection against the spread of *A. chinensis*.
 - (ii) Removal, examination and disposal of *A. chinensis*-infested material, including both the stump and root material. Burning is the most effective way to destroy material, although chipping is also effective when the chipped fragments are less than 2.5 cm in any dimensions. For stumps, grinding is also effective and less time-consuming. In some situations (e.g. with large, very valuable trees), when infestation levels are low, a sleeve wire-mesh cage may be placed around the base of the trunk. A sheet of wire mesh should also be placed on the ground where adults could emerge from below-ground root material. All precautions should be taken to avoid spreading *A. chinensis* after felling.
 - (iii) Prevention of movement of potentially infested material out of the regulated area.
 - (iv) Chemical control: appropriate treatments can be applied against *A. chinensis*. Herbicide treatments may be used to kill stumps and prevent regrowth where stump removal is difficult. This should be carried out in conjunction with covering the crown projection areas (including lateral roots) with wire mesh to prevent the possible movement of emerging adults.
 - (v) Biological control: there are currently no biological control agents (BCAs) for use against *A. chinensis*,

although there are presently ongoing research initiatives to identify biological control candidates (Herard *et al.*, 2006; Maspero, 2007). If a suitable BCA is identified, it should be noted that biological control cannot ensure eradication and may be used only to slow down the spread of *A. chinensis* and to suppress the pest population under containment programmes.

- (vi) Intensive monitoring for the presence of *A. chinensis* by annual surveys at appropriate times on host plants, including targeted destructive sampling where appropriate.

- Carry out activities to raise public awareness concerning the threat of *A. chinensis* and the measures adopted to prevent its introduction into and spread within the country and the EPPO region, and the conditions regarding movement of host plants of *A. chinensis* from the established regulated area.

Enquiries

Enquiries may be addressed to the EPPO Secretariat, 21 boulevard Richard Lenoir, Paris 75011, France or at hq@epo.int.

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Appendix 1 – Detection survey in an area where *Anoplophora chinensis* is not present

Regular detection surveys should be carried out in order to verify that a country is free from *A. chinensis* (according to ISPM 4 *Requirements for the establishment of pest free areas* and ISPM 6 *Guidelines for surveillance*: FAO, 1996, 1997 respectively).

Time of survey

Surveys should be carried out at least once per year at any time, but preferably in September–October (according to the decision of the NPPO concerned). Inspectors should expect to find pupae during April/May; young larvae during June/July; and larger larvae during September/October in the case of 1- and 2-year life cycles. Most of the life cycle takes place under ground in roots.

Material to be surveyed

Survey criteria to determine both presence and absence of *A. chinensis* are based on biological characteristics of the pest; as there are no trapping methods available, trees and stumps are targeted. The following characteristics should be used in designing a survey strategy: known host range and distribution of *A. chinensis*; points of import for plants for planting; and their handling or storage.

Surveys should be pathway-based, which allows resources to be targeted to those pathways with the highest likelihood of *A. chinensis* being present. The main pathway capable of supporting *A. chinensis* is host plants for planting (including bonsai plants) imported from countries where *A. chinensis* occurs; in particular, trees with stem or root collar diameter >1 cm that are moved internationally may have been colonized by *A. chinensis*. The likelihood of finding *A. chinensis* in plants will depend on the state of health of the plants for planting. Survey efforts should concentrate on larger specimens, with emphasis on detection of discoloration and deformation of bark, larval galleries and exit holes. Theoretically, cut branches and wood of host plants, as well as wood packaging material, cannot be excluded completely as pathways for the introduction of the pest from infested areas, but the likelihood of such pathways is much lower. In practice, all interceptions of *A. chinensis* in the EPPO region were in plants for planting imported from infested areas (Asia, Italy, etc.). Therefore surveys should focus on companies involved in trade in host plants for planting, and locations where these plants could be planted:

- nurseries
- garden centres
- park,
- private gardens
- forest boundaries
- street trees
- other locations where imported host trees could be stored or planted.

Methods of monitoring

Survey methods could include the following.

- Identification of potential symptoms due to the tree response:
 - sap oozing from lower section of the tree
 - wilting or loss of foliage
 - tree death or dieback of aerial parts and branches
 - obvious loss of vigour.
- Visual detection of signs of *A. chinensis* activity:
 - *A. chinensis* larval galleries and grub holes – peel off bark on wood to increase the probability of detection
 - approximately 10–15-mm-diameter exit holes (this is the typical size but they may measure 6–20 mm)
 - frass from feeding and exit hole-boring activity

- swelling of stems, discoloration and deformation of bark on plants for planting (including bonsais)
- flying beetles, beetles resting on sunny surfaces, and signs of maturation feeding.
- Destructive sampling of material – carefully examine lower trunk and below-ground woody material for presence of larvae, pupae and adults.
- Use of sniffer dogs trained specifically for detection of *A. chinensis*.
- Use of sound detectors for larval feeding where the NPPO concerned considers this is sufficient.

Identification of the pest

Adults of *A. chinensis* are identified mainly morphologically. For pest larvae, a molecular identification test (PCR) is being developed.

Public awareness

Public awareness activities should especially target those trading plants and plant products, and agencies and stakeholders working with plantations of host plants (e.g. municipalities), parks, nurseries, shelterbelts, ash forests, etc. This is very important for early detection and reduced spread of *A. chinensis*. Public awareness activities can be achieved, for example, via the Internet and through workshops involving growers, gardeners, schoolchildren, tree pruning company employees, entomologists, etc.

Communication

A system should be in place so that each finding or suspicion of *A. chinensis* should be immediately reported to the NPPO.

Appendix 2 – Eradication of *Anoplophora chinensis* upon the detection of an established population

Surveillance to fully investigate the distribution of the pest

When the presence of larvae or adults of *A. chinensis* is confirmed, an intensive delimiting survey (in accordance with ISPM 6) covering an area of 2 km radius surrounding the infested tree(s) should be carried out immediately. The purpose is to determine geographic limits of the infested area (or areas) and then to demarcate the regulated area. The radius may be reduced to 1 km in the case of a small, localized infestation. If further infested trees are detected, the area covered by the delimiting survey should be revised accordingly until no new infested trees are recorded.

All host trees and other material showing symptoms and signs of activity should be inspected for the presence of *A. chinensis*. The inspection should focus on surfaces of trunks. In principle, apparently healthy trees may contain *A. chinensis*; inspection of apparently healthy trees would therefore be valuable. When felling trees, the lower part of the trunk of each tree felled should be examined by cutting it into short slices. Stumps and roots should be also examined.

Measures to prevent the spread of the pest

A regulated area should be established immediately upon the first detection of an outbreak. It should include:

- the infested area, a clear-cut area of 100 m radius around any infested host plant
- a buffer zone (monitoring area) not less than 1 km wide adjacent to the infested area which will be monitored intensively.

The measures to be applied to the movement of all types of host commodity, in order to prevent transfer of *A. chinensis* from the regulated area to other areas, should be at least as stringent as those applied for import. This is done by preventing the insects from emerging from infested wood and thus eliminating the possibility of transfer to other trees where they could create new foci of infestation. These measures are applied in the regulated area to species known to be susceptible to *A. chinensis*.

In the regulated area, plants for planting of species known to be hosts of *A. chinensis* should not be grown in a place of production unless that place of production is inspected and no *A. chinensis* is found. Host plants for planting should be grown under insect-proof conditions, or the plants grown in a site of production with preventive treatments (when available) and a buffer zone of 2 km.

Control measures to eradicate the pest when found

Plants for planting

Infested plants for planting should be destroyed immediately.

Standing trees (living or dead)

When felling trees, the lower part of the trunk of each tree felled should be examined by cutting it into short slices.

Clear-cut areas

Clear-cut areas should be kept free from preferred host plants (see Appendix 3) until *A. chinensis* is declared to be eradicated in the infested areas. To minimize the likelihood of breeding of *A. chinensis* in the stump, the trees should be cut at the soil surface and/or covered by insect-proof material, and stumps should be removed or, when not possible, ‘top ground’ (mechanically destroyed by specialized machinery). Roots should also be examined and removed/destroyed.

Larger infested area

On the basis of visual inspection, it is generally not possible to distinguish living trees expressing wilt symptoms caused by *A. chinensis* from those trees that have wilt symptoms due to any other cause. Early infestation is often symptomless. In an infested area, any dead or dying host trees are therefore to be considered as being potentially infested with *A. chinensis* and should be felled and processed immediately. To minimize the likelihood of *A. chinensis* breeding in the stump, trees should be cut at the soil surface and stumps should be removed or, when not possible, ‘top ground’ (mechanically destroyed by specialized machinery). All felled trees should be assessed for the presence of *A. chinensis*. If *A. chinensis* is detected, all host trees within a radius of at least 100 m (the size chosen should be based on expert judgement) should be felled and destroyed (including all felling debris), as attacks by *A. chinensis* tend to be grouped on neighbouring trees. Felled trees should be inspected thoroughly for the presence of *A. chinensis*. If any infested trees are found, the felling area should be extended by at least a further 100 m.

Trees in urban areas (cities, parks, etc.)

Trees found to be infested should be immediately felled and destroyed/processed and the stumps destroyed. Dissection of material can also provide much information regarding the larvae and the extent of the infestation.

Wood

Wood of host trees from infested and clear-cut areas may be dealt with in the following ways.

- It may be transported freely out of the area provided it is either heat-treated so that the wood-core temperature is maintained at 56°C for 30 min according to EPPO Standard PM 10/6(1), or fumigated with a suitable fumigant according to EPPO Standard PM 10/7(1), or irradiated according to EPPO Standard PM 10/8(1).
- If not treated using an approved procedure, wood should be destroyed completely by burning; if burning is not possible it may be deep-buried under the control and responsibility of the NPPO.
- It may be used for industrial or fuel purposes within the infested and clear-cut areas before the flight period of the pest, in a way that does not allow adult emergence.
- It may be chipped and left on site provided chips do not exceed 2.5 cm in any dimension and can then be moved freely outside the pest flight period.
- Outside the pest flight period, wood may be moved under official control outside the area to an approved processing facility and processed or treated before the start of the next flight period under the control and responsibility of the NPPO.
- May be processed into sawn wood for use within the infested area, provided it is inspected by NPPO and found free from *A. chinensis*. If the wood is derived from trees felled during the *A. chinensis* flight period, it should be

processed immediately into sawn wood. Wood from trees felled outside the *A. chinensis* flight period may be moved under official control outside the area to an approved processing facility, and should be treated, processed or destroyed before the next flight period of the pest under the control and responsibility of the NPPO. Other wood remaining from felled trees should be treated, processed or destroyed under the control and responsibility of the NPPO.

Bark

Isolated bark removed from trees in the infested area could still attract and therefore carry *A. chinensis* beetles, and should be either destroyed (e.g. by burning) or transported in closed containers and under official control to approved processing facilities at any time of the year. It can be freely transported from the infested area outside the pest flight period.

Waste wood and debris

Waste wood and debris produced during felling in the infested area and the clear-cut areas should be destroyed completely by burning at or near the place where the tree was felled, or chipped to a maximum size of 2.5 cm in any dimension, or deep-buried under the control and responsibility of the NPPO. These actions should be carried out as soon as possible after felling, particularly during the summer period. Waste wood produced during other processing procedures should be destroyed by burning, used as industrial fuel, or fumigated with a suitable fumigant under the control and responsibility of the NPPO. Residual and waste wood also may be transported in closed containers and under official control to approved processing facilities outside the pest flight period and utilized before the start of the next flight period.

General measures

General measures taken in the regulated area should aim to decrease the likelihood of build-up and dispersal of *A. chinensis*, and hence reduce the likelihood of spread of the pest which could lead to new foci of *A. chinensis* infestation. This requires the maintenance of a high degree of forest and amenity hygiene.

Appendix 3 – Host plants of *Anoplophora chinensis*

The preferred hosts of *A. chinensis* are:

Acer spp., *Aesculus hippocastanum*, *Alnus* spp., *Betula* spp., *Carpinus* spp., *Citrus* spp., *Cornus* spp., *Corylus* spp., *Cotoneaster* spp., *Crataegus* spp., *Fagus* spp., *Lagerstroemia* spp., *Malus* spp., *Platanus* spp., *Populus* spp., *Prunus laurocerasus*, *Pyrus* spp., *Rosa* spp., *Salix* spp. and *Ulmus* spp.

Other hosts of *A. chinensis* may include:
Casuarina spp., *Cryptomeria* spp., *Ficus* spp., *Hibiscus* spp., *Litchi* spp., *Mallotus* spp., *Melia* spp., *Morus* spp. and other woody plants.

More complete data on the host plants of *A. chinensis* are given in the Table A3.1 (Van der Gaag *et al.*, 2010):

Table A3.1

Plant genus*	Infested in Europe?	Intercepted: country of interception/ origin [†] (years of interception)	Source [‡]
<i>Acacia</i>	Italy: Lombardy [§]		a
<i>Acer</i>	Italy: Lombardy, Lazio; Netherlands	Various EU-countries/China, Japan, Korea (many interceptions since about 1980)	a; b; c
<i>Aesculus</i>	Italy: Lombardy, Lazio		a; b
<i>Albizzia</i>	–		a
<i>Aleuritis</i>	–		a
<i>Alnus</i>	Italy: Lombardy		a; b
<i>Aralia</i>	–		a
<i>Atalantia</i>	–		a
<i>Betula</i>	Italy: Lombardy		a, b
<i>Broussonetia</i>	–		a
<i>Cajanus</i>	–		a
<i>Camellia</i>	–		a
<i>Carpinus</i>	Italy: Lombardy; Netherlands		a, b, c
<i>Carya</i>	–		a
<i>Castanea</i>	–		a
<i>Castanopsis</i>	–		a
<i>Casuarina</i>	–		a; Qi (1997)
<i>Catalpa</i>	–		Wang & Chen (1984)
<i>Celastrus</i>	–	NL/China [¶] (1988)	c
<i>Cercis</i>	–	Cyprus/China (2009)	NPPO of Cyprus
<i>Chaenomeles</i>	–	NL/Japan [¶] (1988; 1989)	c
<i>Citrus</i>	Italy: Lombardy		a, b
<i>Cornus</i>	Italy: Lombardy; Netherlands		a, b; c
<i>Corylus</i>	Italy: Lombardy, Lazio; Netherlands		a, b, c
<i>Cotoneaster</i>	Italy: Lombardy		a, b
<i>Crataegus</i>	Italy: Lombardy; Netherlands		a; b; c
<i>Cryptomeria</i>	Italy: Lombardy [§]		a, b; Wang & Chen (1984)
<i>Eleagnus</i>	–		a
<i>Eriobotrya</i>	Italy: Lombardy [§]		a, b
<i>Fagus</i>	Italy: Lombardy		a, b
<i>Ficus</i>	Italy: Lombardy [§]		a, b
<i>Fortunella</i>	–		a
<i>Fraxinus</i>	–		a
<i>Grevillea</i>	–		Wang & Chen (1984)
<i>Hedera</i>	–		a
<i>Hibiscus</i>	–		a
<i>Ilex</i>	–		a
<i>Juglans</i>	–		a
<i>Lagerstroemia</i>	Italy: Lombardy	USA/China (1999); Croatia/China (2007)	a, b; Anonymous (2001); Vukadin & Hrasovec (2008)
<i>Lindera</i>	–		a
<i>Litchi</i>	–		a
<i>Liquidambar</i>	Italy: Lombardy		b
<i>Mackia</i>	–		a
<i>Mallotus</i>	–		a
<i>Malus</i>	Italy: Lombardy	NL/Japan [¶] (1986–1988) UK/Japan (year unknown)	a, c; A. Macleod, Fera, UK, pers. comm. 2008
<i>Melia</i>	–		a

(continued)

Table (continued)

Plant genus*	Infested in Europe?	Intercepted: country of interception/ origin [†] (years of interception)	Source [‡]
<i>Morus</i>	–		a
<i>Olea</i>	–		a
<i>Ostria</i>	Italy: Lombardy		Field observation by F. Hérard
<i>Parrotia</i>	Italy: Lombardy		Field observation by F. Hérard
<i>Persea</i>	–		a
<i>Pholinia</i>	–		a
<i>Pinus</i>	–		a
<i>Platanus</i>	Italy: Lombardy, Lazio		a, b
<i>Polygonum</i>	–		a
<i>Poncirus</i>	–		a
<i>Populus</i>	Italy: Lombardy		a, b
<i>Prunus</i>	Italy: Lombardy		a, b
<i>Psidium</i>			a
<i>Pyrocantha</i>			a
<i>Pyrus</i>	Italy: Lombardy		a, b
<i>Quercus</i>	Italy: Lombardy ^{††}		a, b
<i>Rhododendron</i>	Italy: Lombardy		b
<i>Rhus</i>	–		a
<i>Robinia</i>	–		a
<i>Rosa</i>	Italy: Lombardy; Croatia		a, b, Vukadin & Hrasovec (2008)
<i>Rubus</i>	–		a
<i>Sageretia</i>	–	NL/China [¶] (1987, 1988)	c
<i>Salix</i>	Italy: Lombardy		a, b
<i>Sapium</i>	–		a
<i>Schinia</i>	–		a
<i>Sophora</i>	–		a
<i>Sorbus</i>	Italy: Lombardy		b
<i>Stranvaesia</i>	–		a
<i>Stylurus</i>	–		a
<i>Styrax</i>	–		a
<i>Tectorum</i>	–		a
<i>Toona</i>	–		Wang & Chen (1984)
<i>Ulmus</i>	Italy: Lombardy		a, b
<i>Vernicia</i>	–		d
<i>Viburnum</i>	Italy: Lombardy [§]		b
<i>Ziziphus</i>	–		d

*Note that for many plant taxa listed, no indication was found in the literature that *A. chinensis* completed its life cycle on these taxa. Sometimes a whole genus has been listed, sometimes one or several species within one genus (e.g. *Ficus carica* is, so far as is known, the only *Ficus* species reported as a host plant). The genus is listed even when only one species has been reported within the genus.

[†]Interceptions of pests notified as *Anoplophora* spp. were considered to be *A. chinensis* (see also Haack *et al.*, 2010).

[‡]a: Lingafelter & Hoebeke (2002); b: Haack *et al.* (2010); c: NPPO of Netherlands; d: CABI (2007).

[§]Partial development recorded from Europe/host plant status unconfirmed (Haack *et al.*, 2010).

[¶]Larvae intercepted. Full development shown on *Chaenomeles* spp. following incubation (NPPO of Netherlands).

^{††}In Italy, *Quercus* spp. is a questionable host as the presence of *A. chinensis* has never been confirmed (Van der Gaag *et al.*, 2008).

Addendum

European and Mediterranean Plant Protection Organization
Organisation Européenne et Méditerranéenne pour la Protection des Plantes

PM 9/16 (1)

National regulatory control systems
Systèmes de lutte nationaux réglementaires

PM 9/16 (1) *Anoplophora chinensis*: procedures for official control

This Standard (OEPP/EPPO, 2013) was published in December 2013 in the National regulatory control systems section of the *EPPO Bulletin*.

In this Standard some of the Latin names for the plant genera of host plants of *Anoplophora chinensis* listed in Table A3.1 in Appendix 3 were incorrectly spelt. The corrected spellings are listed below. The EPPO Bulletin would like to apologize for this error.

Written in the standard as	Corrected spelling
<i>Albizza</i>	<i>Albiza</i>
<i>Aleuritis</i>	<i>Aleurites</i>
<i>Eleagnus</i>	<i>Elaeagnus</i>
<i>Ostria</i>	<i>Ostrya</i>
<i>Pholinia</i>	<i>Photinia</i>
<i>Schinia</i>	<i>Schima</i>
<i>Tectorum</i>	<i>Tectona</i>

Reference

OEPP/EPPO (2013) EPPO Standard PM 9/16 (1) *Anoplophora chinensis*: procedures for official control. *Bulletin OEPP/EPPO Bulletin* 43, 518–526.