

# EPPO Datasheet: *Anoplophora glabripennis*

Last updated: 2020-10-28

## IDENTITY

**Preferred name:** *Anoplophora glabripennis*

**Authority:** Motschulsky

**Taxonomic position:** Animalia: Arthropoda: Hexapoda: Insecta:  
Coleoptera: Cerambycidae

**Common names:** Asian long-horned beetle, Asian longhorn beetle,  
basicosta white-spotted longicorn beetle, starry sky beetle

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**EPPO Categorization:** A2 list

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**EU Categorization:** Emergency measures, A1 Quarantine pest  
(Annex II A)

**EPPO Code:** ANOLGL



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## Notes on taxonomy and nomenclature

Thanks to an intense taxonomical revision, the past confusion existing within the genus *Anoplophora* has been largely resolved. The genus *Anoplophora* currently includes 36 species (Lingafelter & Hoebeke, 2002). *Anoplophora glabripennis* represents a single taxonomic entity, although previous classifications (Wu & Jiang, 1998) included *A. glabripennis* within the *glabripennis*-complex, comprising *A. freyi*, *A. flavomaculata* and *A. coeruleoantennatus* (EFSA, 2019a).

## HOSTS

*Anoplophora glabripennis* is a highly polyphagous cerambycid with a wide host range including several broadleaved tree species in both urban environments and naturally regenerating and planted forests. *Anoplophora glabripennis* is able to complete its life cycle on more than 30 plant species or genera. Although *Acer* spp. appeared to be the most attractive genus (Gao *et al.*, 1997; Haack *et al.*, 1997; Faccoli & Favaro, 2016) for *A. glabripennis*, its host range differs between native (Asia) and invaded areas (USA, Canada and Europe) (Haack *et al.*, 2010).

In its native area (Asia), *A. glabripennis* can infest healthy trees, in particular those belonging to the plant genera *Acer*, *Populus*, *Salix* (e.g., *S. babylonica*, *S. matsudana*) and *Ulmus* (Lingafelter & Hoebeke, 2002; Wang, 2004; Williams *et al.*, 2004; Haack, 2006). The major hosts are *Populus* species and hybrids in the section *Aigeiros* (e.g., *P. nigra*, *P. deltoides*, *P. x canadensis*) and the Chinese hybrid *P. dakhuanensis* (Hu *et al.*, 2009). Some poplars in the other sections (*Alba* and *Tacamahaca*) are also affected, but are only slightly susceptible (Li & Wu, 1993; Haack *et al.*, 2010). Other broadleaved plant genera have also been recorded as occasional hosts: *Alnus* spp., *Malus* spp., *Melia* spp., *Morus* spp., *Platanus* spp., *Prunus* spp., *Pyrus* spp., *Robinia* spp., *Rosa* spp., and *Sophora* spp. (Lingafelter & Hoebeke, 2002; Wang, 2004; Wang *et al.*, 2005; Smith *et al.*, 2009; EFSA, 2019a, b).

In the invaded areas (USA, Canada and Europe), *A. glabripennis* was mainly reported on *Acer* spp., but it is able to complete its life cycle on other broadleaved trees genera: *Aesculus* spp., *Betula* spp., *Cercidiphyllum* spp., *Fraxinus* spp., *Platanus* spp., *Populus* spp., *Salix* spp., *Sorbus* spp., and *Ulmus* spp. (CABI, 2019; Haack *et al.*, 2006; Hérard *et al.*, 2006; Turgeon *et al.*, 2007; Sawyer, 2008; EFSA, 2019a, b). In Europe, different levels of susceptibility are reported on *Populus* spp. (Haack *et al.*, 2010; Faccoli & Gatto, 2016).

In Italy, where *A. glabripennis* is still present, during survey activities carried out from 2009 to 2019 on more than 170 000 plants (more than 30 plant genera), *A. glabripennis* has been recorded to infest: *Acer* spp. (*A. campestre*, *A. negundo*, *A. platanoides*, *A. pseudoplatanus*, *A. saccharinum*), *Aesculus* spp., *Betula* spp., *Populus* spp., *Salix* spp. and *Ulmus* spp. (Regione Lombardia, 2020a).

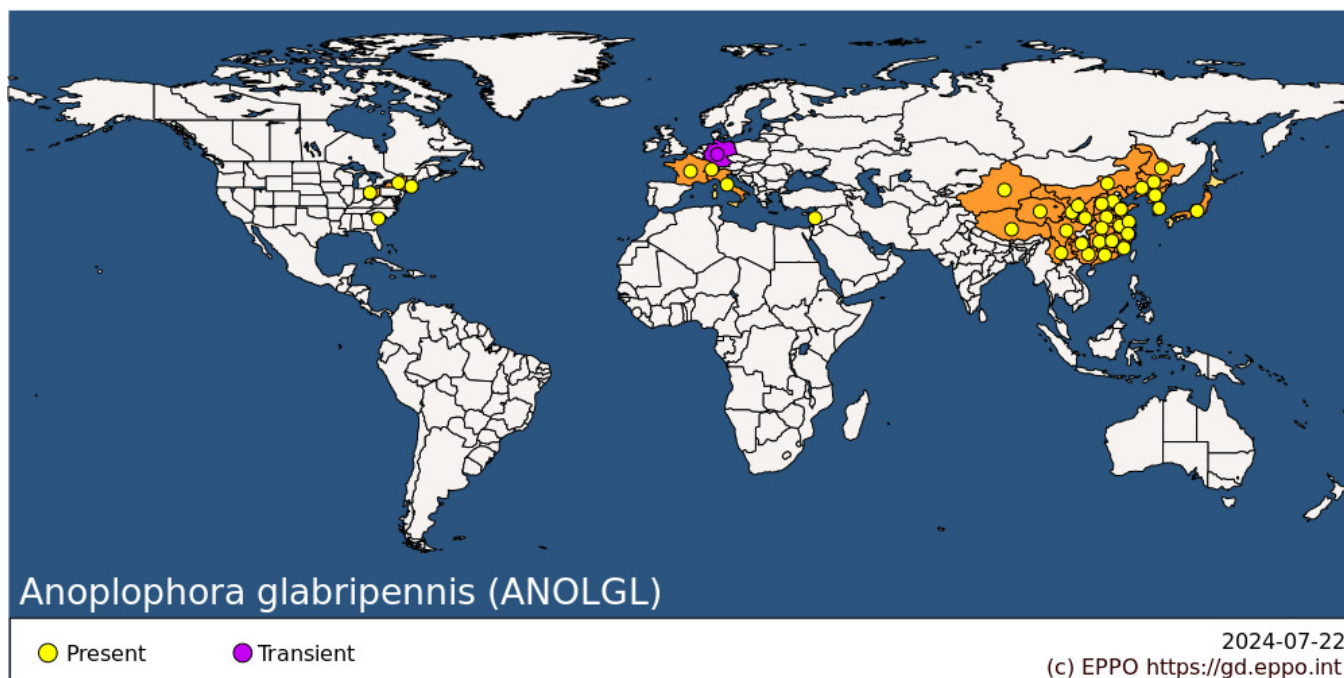
Currently, *A. glabripennis* has never been recorded on conifer trees as well as on one of the most important broadleaved European forest genus, *Quercus*; only *Quercus rubra* was reported as host of *A. glabripennis* in the USA (EPPO, 2013).

**Host list:** *Acer buergerianum*, *Acer negundo*, *Acer pensylvanicum*, *Acer pictum subsp. mono*, *Acer platanoides*, *Acer pseudoplatanus*, *Acer pseudosieboldianum*, *Acer rubrum*, *Acer saccharinum*, *Acer saccharum*, *Acer tegmentosum*, *Acer truncatum*, *Acer*, *Aesculus hippocastanum*, *Albizia julibrissin*, *Albizia*, *Alnus*, *Betula nigra*, *Betula pendula*, *Betula*, *Broussonetia papyrifera*, *Cajanus cajan*, *Carpinus betulus*, *Carpinus*, *Carya illinoensis*, *Casuarina*, *Celtis*, *Cercidiphyllum japonicum*, *Cercidiphyllum*, *Corylus colurna*, *Elaeagnus angustifolia*, *Fagus sylvatica*, *Fagus*, *Fraxinus pennsylvanica*, *Fraxinus*, *Gleditsia*, *Koelreuteria paniculata*, *Koelreuteria*, *Mallotus japonicus*, *Malus domestica*, *Malus*, *Melia azedarach*, *Melia*, *Morus alba*, *Morus*, *Platanus occidentalis*, *Platanus orientalis*, *Platanus*, *Populus balsamifera*, *Populus cathayana*, *Populus deltoides*, *Populus lasiocarpa*, *Populus maximowiczii*, *Populus nigra*, *Populus simonii*, *Populus x canadensis*, *Populus*, *Prunus serrulata*, *Prunus x yedoensis*, *Pyrus bretschneideri*, *Quercus rubra*, *Salix babylonica*, *Salix nigra*, *Salix*, *Sorbus aucuparia*, *Sorbus*, *Ulmus americana*, *Ulmus parvifolia*, *Ulmus pumila*, *Ulmus*, *Vernicia montana*

## GEOGRAPHICAL DISTRIBUTION

*A. glabripennis* is native to China and the Korean Peninsula (Lingafelter & Hoebeke, 2002); currently, it is present in most Chinese provinces. Specimens have been recorded in Japan, but the beetle is not considered to be established in the area (pest eradicated; Lingafalter & Hoebeke, 2002). *A. glabripennis* has been accidentally introduced in North America (USA and Canada) and Europe through international trade on wood packaging materials and it continues to be intercepted worldwide. In North America, the beetle was officially detected in the USA in 1996. *A. glabripennis* is present in Massachusetts, New York, Ohio and South Carolina with few occurrences or limited distribution (EPPO, 2020a). As a result of intensive surveys and strict phytosanitary measures, *A. glabripennis* was officially declared eradicated in Illinois and New Jersey in March 2008. Nevertheless, in August 2008 a specimen was detected in the city of Deerfield (Illinois), but no new infested trees have been identified since then. Additional interceptions were also reported in California and Washington, but the incursions have not led to the establishment of the pest (EPPO, 2020a). In Canada, *A. glabripennis* was first detected in Ontario, near Toronto, in 2003 (Turgeon *et al.*, 2015), but the population was successfully eradicated. A second outbreak was detected in the city of Mississauga (near Toronto) in September 2013 (EPPO RS, 2014, 2015). After five years of surveys with no detection of this pest, the NPPO of Canada officially declared the successful eradication of *A. glabripennis* in the cities of Mississauga and Toronto, and as a consequence from its whole territory (EPPO RS, 2020).

In Europe the first record was in Austria in 2001 (Hérard *et al.*, 2006). In Italy *A. glabripennis* was first found in 2007 in Lombardia Region (EPPO RS, 2007/166, 2014/023). It was later found in Veneto, Marche and Piemonte Regions in 2009, 2013 and 2018, respectively. Additional local outbreaks have been observed in other European countries and new interceptions are frequently reported (EPPO, 2020a). The beetle has been detected in Lebanon in 2015 and 2016 (Moussa & Cocquempot, 2017). However, in all new outbreaks it is subject to eradication measures. In January 2021, Austria declared the successful eradication of the pest from its territory.



**EPPO Region:** France (mainland), Germany, Italy (mainland), Switzerland

**Asia:** China (Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Neimenggu, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizhang, Yunnan, Zhejiang), Japan (Honshu), Korea Dem. People's Republic, Korea, Republic, Lebanon

**North America:** United States of America (Massachusetts, New York, Ohio, South Carolina)

## BIOLOGY

*A. glabripennis* generally takes one year to complete its life cycle, although it can also take two to three years depending on climatic and feeding conditions (Hua *et al.*, 1992; Haack *et al.*, 2010). Thus, there can be one or two generations per year. In China, the length of the lifecycle varies with climate and latitude. The further north *A. glabripennis* is found, the longer it takes for a generation to develop. In Taiwan, there is one generation per year. In Eastern China, a generation may take one or two years to develop, while in Northern China (Neimenggu), a single generation takes two years to develop. Similar behavior was observed in Europe, where full development typically requires approximately one year in Italy and two to three years in infested areas located north of the Alps (EFSA, 2019a).

Depending on local temperatures, adults have been observed from April to December, with peak activity usually in May to July (Haack *et al.*, 2010). For instance, Faccoli *et al.* (2015) stated that 90% of the beetles emergence was reached around 20th July in Italy in three consecutive years (2010-2012). The adults usually remain on the tree from which they emerged for 10-15 days before oviposition, or fly short distances to nearby trees, and feed on twigs, petioles and veins of leaves. Mate-finding is mediated by contact and short-range pheromones (He & Huang, 1993; Zhang *et al.*, 2002, 2003). Although adult survival for longer than 70 days has also been recorded (Faccoli *et al.*, 2015), the mean lifespan is approximately one month (Li & Wu, 1993; Faccoli *et al.*, 2015) with no significant differences between males and females. Adult longevity and fecundity are influenced by the larval host plant and temperature conditions (He & Huang, 1993; Smith *et al.*, 2002; Morewood *et al.*, 2003; Keena, 2002, 2006; Hajek & Kalb, 2007). Egg deposition begins a week after copulation. The eggs, about 30-32 per female (Wong & Mong, 1986), are laid one by one under the bark, in oviposition slits chewed out by the female. In Northern Italy, Faccoli *et al.* (2016) reported a fecundity of 60 eggs per female. Slits are generally cut on the eastern side of the trunk or of branches greater than 5 cm in diameter (Li & Wu, 1993). Eggs hatch after about two weeks. The larva feeds in the cambial layer of bark in the branches and trunk and later enters the woody tissues. Larvae expel frass from their tunnels near the original oviposition site. Most individuals overwinter as larvae. Larvae appear to need to reach a critical weight before overwintering to induce pupation the next summer (Keena, 2005). In late spring and early summer, pupation takes place in chambers in the heartwood, accompanied by presence of characteristic wood 'shavings' that are packed into the chamber. Adults emerge from circular exit holes above the sites where the eggs were laid; holes measure 10-15 mm in diameter (EFSA, 2019a), but can range from 6 to 20 mm (Yan & Qin, 1992;

Lingafelter & Hoebeke, 2002; Turgeon *et al.*, 2007). Unlike many cerambycid species, *A. glabripennis* can attack healthy trees as well as trees under stress. Several generations can develop within an individual tree, leading eventually to its death.

## DETECTION AND IDENTIFICATION

### Symptoms

Most of the symptoms of *A. glabripennis* tend to be detected from approximately 1.5 m above the ground up to the middle of the crown (EPPO, 2013) and are associated with the activities of its different life stages (Ric *et al.*, 2007; Haack *et al.*, 2010; EFSA, 2019a): 1) the female oviposition activity – rounded pits are visible on the bark for few weeks after oviposition and the sap oozing out of freshly cut pits may be also observed; occasionally, *A. glabripennis* produces T-shaped oviposition slits which are the same as those produced by *A. chinensis* (Haack *et al.*, 2010); 2) the larvae feeding activity within the wood – galleries under the bark and, later, tunnels in the wood can be recognized; given that the frass is deposited within the larval galleries, the presence of large amounts of frass and wood shavings is rare; 3) the emergence of mature adults – circular exit holes (10-15 mm in diameter), usually located above oviposition pits, are visible on the upper part of the trunk and main branches; masses of wood shavings extruding from round exit holes are also signs that adults have emerged from infested wood. Piles of wood shavings also collect at the base of infested trees; 4) the adult feeding activity – leaves, petioles, the bark of young branches (1-3 years) and shoots can be damaged; however, feeding sites of the adults are visible only for few weeks (EFSA, 2019a). Damage to woody tissue (Sjöman *et al.*, 2014) results in heavy sap flow from wounds which are then liable to attack by secondary pests and pathogens.

More general symptoms can be observed on trees these include wilting foliage, sectorial crown discoloration, branch desiccation and deformation of bark. However, it should be noted that the crowns remain asymptomatic for at least 3-4 years after the beginning of the infestation. Although larval galleries cannot be observed on living trees, they are a useful indicator of infestation on processed wood (e.g., wood packaging material).

### Morphology

#### Eggs

The eggs are 5-7 mm in length, oblong, with a shape similar to a rice grain (Lieu, 1945; Lingafelter & Hoebeke, 2002; EFSA, 2019a). When laid, the egg is white, but during development it becomes yellowish-brown. The ends of the eggs are slightly concave (Peng and Liu, 1992).

#### Larvae

The larvae comprise a head segment, three thoracic segments and several abdominal segments. The head is brown, while thoracic and abdominal segments are typically cream coloured. The first segment of the thorax is the largest and has a brown sclerotized shield on the dorsal side. The body tapers from thorax to abdomen. The young larvae measure between 7 and 20 mm, the mature larvae between 30 and 60 mm (Cavey *et al.*, 1998; Ric *et al.*, 2007; EFSA, 2019a). Larvae have neither legs nor bristles.

#### Pupae

The pupae are whitish, 27-38 mm by 11 mm (Lieu, 1945; Lingafelter & Hoebeke, 2002; Ric *et al.*, 2007). The shape is typical of cerambycids with antenna which are visible in the ventral position and spiral-shaped (EFSA, 2019a).

#### Adults

Adults have a typically cerambycid shape. Males are 19-32 mm long by 6.5-11 mm wide; females are 22-36 mm long by 8-12 mm wide (Ric *et al.*, 2007). The body is jet-black, glossy and may have a bluish tinge. The elytra have about 10-20 distinct irregular-shaped white or yellow spots, although in rare instances the number of patches ranges from 0 to over 60 (Lingafelter & Hoebeke, 2002; pers. comm. Dr M Faccoli, University of Padova, 2019). The major

distinction between the adults of *A. glabripennis* and *A. chinensis*, the citrus long-horned beetle, is the lack of small projections (tubercles) on the basal quarter of each elytron in *A. glabripennis* (Thomas, 2004; Haack *et al.*, 2010; EPPO, 2016a). The antennae have 11 segments with an alternate blue-white and blue-black banding pattern (Ric *et al.*, 2006). Males have antennae which are clearly longer than their body, while in females these are as long as their body (EFSA, 2019a). The ratio of antennal length to body length ranges is about 1.6-2.5 for males and 1.2-1.8 for females (Ric *et al.*, 2007).

## Detection and inspection methods

### *Visual inspections and traps*

The visual inspection of plants to detect the presence of *A. glabripennis* (in its various life stages) and/or the signs of infestation is pivotal, representing the first stage of the diagnosis process. The visual inspection should be performed at crown level where oviposition and adult emergence occur. Depending on survey conditions and to improve the pest detection, the inspections can be conducted using binoculars, bucket trucks or tree climbers (Haack *et al.*, 2010). In some European countries, the visual inspection of plants is performed both in summer, to detect symptoms of the activities of different life stages of the pest, and in winter, to detect the circular exit holes of adults (EFSA, 2019a). Lombardia Region (Italy) considers that the most effective surveillance strategy is to carry out survey activities at the end of the summer to detect fresh signs of pest presence and repeat them during the period of absence of leaves by combining the use of binoculars, bucket trucks and tree climbers (Regione Lombardia, 2020a).

However, other detection methods can be useful to improve the inspection process. In several EPPO countries the use of sniffer dogs can be a sensitive and useful inspection strategy (Hoyer-Tomiczek *et al.*, 2016).

A real-time PCR test allowing the detection of *A. glabripennis* DNA in frass is under development (pers. comm. Dr A Taddei, ANSES Plant Health Laboratory, FR, 2020).

Traps baited with male pheromones and different combinations of plant-derived volatiles can be used to catch adults of *A. glabripennis*. Traps can be used to monitor the areas where *A. glabripennis* has not yet been detected and to delimit the boundaries of an area considered to be infested by *A. glabripennis* (EFSA, 2019a). In Italy (Lombardia Region), where traps have been used for many years, the best results have been obtained in the recently discovered outbreaks and in those where eradication is close to being achieved. In addition, the traps are used for early detection in sites considered to be at risk (e.g., stone importers from areas where the pest is widely distributed) (Regione Lombardia, 2020a).

Additional information on tree monitoring is available in EPPO Standard PM 9/15(1) (EPPO, 2013).

Finally, activities to raise professional and public awareness concerning the threat of *A. glabripennis* are important. For instance, in the Lombardia Region (Italy), since the beginning of the infestation (Maspero *et al.*, 2007), a notable communication campaign has been held (Ciampitti & Cavagna, 2014). Citizens also support the surveillance of *A. glabripennis* through the citizen science app FitoDetective (Regione Lombardia, 2020b).

### *Identification of A. glabripennis*

Morphological identification of *A. glabripennis* is possible on late instar larvae and adults. For this purpose, a number of useful taxonomical keys and guides are available in the literature (e.g., Lingafelter & Hoebecke, 2002; Ric *et al.*, 2007; Pennacchio *et al.*, 2012). An EPPO diagnostic protocol for this pest is in preparation. Molecular identification of specimens can be performed using DNA barcoding (see EPPO Standard PM 7/129 (EPPO, 2016b)). In the Barcode of Life Data System ([BOLDSYSTEMS](#)), sequences of at least 50 haplotypes are available. In EPPO-Q-bank, sequences from 16 curated specimens are available ([EPPO-Q-bank](#)).

## PATHWAYS FOR MOVEMENT

In international trade, *A. glabripennis* is most likely to move as eggs, larvae or pupae in packing material or dunnage made of the wood of host species. Individual larvae and adults have been intercepted in several EPPO countries in wooden packaging material (CABI, 2019). The import of plants for planting, including bonsais, may represent

another pathway for the introduction of *A. glabripennis* (EPPO, 2013).

In natural conditions *A. glabripennis* spreads slowly. The maximum annual spread rate was estimated at 300 m from the closest infested trees (Smith *et al.*, 2004; Favaro *et al.*, 2015). Sometimes, adults can move further than 2 km (Favaro *et al.*, 2015). However, adults are able to complete their maturation feeding on the same tree without the need to fly far (Favaro *et al.*, 2015). In experimental conditions, adults can cover distances up to 14 km (Javal, 2017).

## PEST SIGNIFICANCE

### Economic impact

Over the last 30-40 years, there has been a policy in China to plant hybrid poplars in plantations, along roads, around farm buildings, etc. This started in Henan and Shandong provinces, but was eventually applied in most of the country. Initially, only few hybrids were used, but in vast number. Some of these hybrids were imported from other continents, while others were bred in China. Some of these, but not all, proved to be very susceptible to *A. glabripennis* and suffered serious damage. *A. glabripennis* has proliferated on these susceptible hosts, becoming a common pest in many parts of China, also attacking a range of other hardwood hosts, especially *Salix* spp. These hosts appear to be mainly fruit, ornamental and amenity trees. Since the 1980s, hybrids which are resistant to the pest have been used for new plantations of poplar (Pan, 2005), and there has been a corresponding decline in the importance of *A. glabripennis*. There is no indication that *A. glabripennis* is a pest of natural forests in China. Poplar wood damaged by *A. glabripennis* larvae can be downgraded and lose value by up to 46% (Gao *et al.*, 1993).

In North America and Europe, *A. glabripennis* represents a significant threat especially in urban landscapes. Indeed, the structural weakening of trees caused by larvae activity within woody tissues poses a danger to pedestrians and vehicles from falling branches.

At a world scale, the costs for *A. glabripennis* eradication programs vary depending on the number and size of outbreaks, the length of time since discovery and the type of treatments used (Faccoli & Gatto, 2016). In China, *A. glabripennis* caused about 1.5 billion USD of economic losses per year, corresponding to 12% of economic losses from forest pests (Hu *et al.*, 2009). In the USA, its maximum potential impact is estimated at 669 billion USD, with a loss of almost 35% of the canopy and of 30% tree mortality (Nowak *et al.*, 2001). In New York State, the suppressing program of 1996 infestation cost more than 4 million USD (USDA, 1998). Between 1998 and 2006, the USA invested nearly 249 million USD in eradication programs (Smith *et al.*, 2009). Haack *et al.* (2010) stated that, as of 2008, total costs for eradication programs were 373 million USD in USA, 464 000 EUR in Austria, 55 000 EUR in France, 65 000 EUR in Germany and 23.5 million CAD in Canada. In 2015, a study was performed to quantify the costs of *A. glabripennis* in the first year of the eradication program in Northern Italy (Faccoli & Gatto, 2016). 367 infested trees were removed, and the total costs amounted to 48 000 EUR (41% for plant removal, 38% for trees survey and 21% for scientific advice). The expected damage in the following year was reduced by 52%; the ornamental value of the saved trees was 6 times higher than the costs for their protection (Faccoli & Gatto, 2016).

### Control

In China, control measures include the direct application of insecticides (Chen *et al.*, 1990; Liang *et al.*, 1997), trap trees combined with insecticide treatments (Sun *et al.*, 1990) or the use of insect-pathogenic nematodes (providing up to 94% mortality; Liu *et al.*, 1992). As certain poplar hybrids are relatively resistant (Qin *et al.*, 1996), the planting of such hybrids is now preferred, and the use of very susceptible hybrids is avoided.

In North America and Europe, *A. glabripennis* is subject to eradication, a long process requiring continued efforts for monitoring and cutting down trees. The infested sites are monitored to identify newly attacked trees, which are cut down and chipped. The deriving wood material is transported, under official control, to an approved processing facility (e.g., waste-to-energy plant).

Beginning in the first year of detection of the infestations in North America and Europe, major eradication efforts were implemented in each infested site. However, *A. glabripennis* adults and newly infested trees were recorded each year in most sites, even where the initial size of the infestation was limited (Hérard *et al.*, 2009). In the USA,

control measures aim to contain and eradicate the outbreaks in urban areas. However, the cryptic lifestyle and tendency of the beetle to lay small numbers of eggs on several trees combine to make it difficult to define the limits of the outbreak and thus eradicate the beetle without destroying large numbers of trees. In most situations, wholesale felling of infested trees is unlikely to be a viable option, unless the infestation is very localized. For the EPPO region, a national regulatory control system for the monitoring, eradication and containment of *A. glabripennis* is available in EPPO Standard PM 9/15(1) (EPPO, 2013).

### Phytosanitary risk

*A. glabripennis* is able to attack and cause damages to fruit, ornamental and forest plants of a very broad range of species. The same plant species may grow in natural forests, in agricultural areas or can be cultivated in urban areas as ornamental trees, however *Anoplophora glabripennis* infestations are often confined to urban isolated trees in the countries where the pest has been introduced (Faccoli et al., 2016).

The availability of host plants is not a limiting factor for its establishment and spread in the EPPO countries as well as climatic conditions, except in the most northern areas.

The number of new outbreaks and interceptions reported since the late 1990s to date, in North America and Europe, show that, despite the implementation of international rules, the risk of accidental introduction of this pest via wood packaging material remains high. For this reason, it is important to implement surveillance and early detection activities in areas with a higher commercial flow.

### PHYTOSANITARY MEASURES

The main pathway of *A. glabripennis* is wood packaging material and therefore the most important phytosanitary measure to be applied in international trade is the use of wood packaging that meets the requirements of the ISPM 15.

The survey, felling and destruction of infested trees are effective to reduce population size, prevent spread and, in some circumstances, to attempt eradication (MacLeod et al., 2002).

As a general approach, it has also been recommended that when importing plants for planting (except seeds) and wood commodities of *Betula*, *Fagus*, *Fraxinus*, *Populus*, *Quercus*, *Salix*, and *Ulmus* from countries where *A. glabripennis* occurs, precautions should have been taken to avoid any infestations while the consignments are transported through possibly infested areas (EPPO, 2017a, b, c, d; EPPO, 2018; EPPO, 2020b, c).

### REFERENCES

CABI (2019) Invasive Species Compendium. *Anoplophora glabripennis* (Asian longhorned beetle) – Datasheet. Last modified 25 November 2019. <https://www.cabi.org/isc/datasheet/5557> [accessed on 9 September 2020].

Cavey JF, Hoebeke ER, Passoa S & Lingafelter SW (1998) A new exotic threat to North American hardwood forests: an Asian longhorned beetle, *Anoplophora glabripennis* (Motschulsky) (Coleoptera: Cerambycidae). I. Larval description and diagnosis. *Proceedings of the Entomological Society of Washington* **100**, 373–381.

Chen JL, Gao ZX, Chen J, Zhu CS & Zhou DY (1990) [Trial on control of *Anoplophora glabripennis* with insecticides]. *Forest Research* **3**, 95–97 (in Chinese).

Ciampitti M & Cavagna B (2014) Public awareness: a useful tool for the early detection and a successful eradication of the longhorned beetles *Anoplophora chinensis* and *A. glabripennis*. *EPPO Bulletin* **44**(2), 248–250.

Commission Delegated Regulation (EU) 2019/1702 of 1 August 2019 supplementing Regulation (EU) 2016/2031 of the European Parliament and of the Council by establishing the list of priority pests.

Commission Implementing Decision (EU) 2015/893 as regards measures to prevent the introduction into and the spread within the Union of *Anoplophora glabripennis* (Motschulsky).

- EFSA (2019a) Hoppe B, Schrader G, Kinkar M & Vos S. Pest survey card on *Anoplophora glabripennis*. EFSA Supporting Publication 2019:EN-1750. 30 pp. <https://doi.org/10.2903/sp.efsa.2019.EN-1750>
- EFSA (2019b) Baker R, Gilioli G, Behring C, Candiani D, Gogin A, Kaluski T, Kinkar M, Mosbach-Schulz O, Neri FM, Preti S, Rosace MC, Siligato R, Stancanelli G & Tramontini S. *Anoplophora glabripennis* - Pest Report and Datasheet to support ranking of EU candidate priority pests. Technical Report. <https://doi.org/10.5281/zenodo.2786189>
- EFSA (2019b) Baker R, Gilioli G, Behring C, Candiani D, Gogin A, Kaluski T, Kinkar M, Mosbach-Schulz O, Neri FM, Preti S, Rosace MC, Siligato R, Stancanelli G & Tramontini S. *Anoplophora glabripennis* - Pest Report and Datasheet to support ranking of EU candidate priority pests. Technical Report. <https://doi.org/10.5281/zenodo.2786189>
- EPPO (2013) PM 9/15(1) *Anoplophora glabripennis*: procedures for official control. *EPPO Bulletin* **43**(3), 510–517.
- EPPO (2016a) PM 3/79(1) Consignment inspection for *Anoplophora chinensis* and *Anoplophora glabripennis*. *EPPO Bulletin* **46**(1), 58–67.
- EPPO (2016b) PM 7/129(1) DNA barcoding as an identification tool for a number of regulated pests. *EPPO Bulletin* **46**(3), 501–537.
- EPPO (2017a) PM 8/5(1) *Quercus*. *EPPO Bulletin* **47**(3), 452–460.
- EPPO (2017b) PM 8/6(1) *Betula*. *EPPO Bulletin* **47**(3), 461–469.
- EPPO (2017c) PM 8/7(1) *Populus*. *EPPO Bulletin* **47**(3), 470–478.
- EPPO (2017d) PM 8/8(1) *Salix*. *EPPO Bulletin* **47**(3), 479–486.
- EPPO (2018) PM 8/9(1) *Fagus*. *EPPO Bulletin* **48**(3), 495–500.
- EPPO (2020a) *Anoplophora glabripennis*. Distribution. EPPO Global Database. Last updated 02 September 2020. <https://gd.eppo.int/taxon/ANOLGL/distribution> [accessed on 9 September 2020].
- EPPO (2020b) PM 8/10(1) *Ulmus*. *EPPO Bulletin* **50**(1), 88–98.
- EPPO (2020c) PM 8/11(1) *Fraxinus*. *EPPO Bulletin* **50**(1), 99–106.
- EPPO RS (2014) EPPO Reporting Service No. 02. Num. Article 2014/022 *Anoplophora glabripennis* found again in Canada. <https://gd.eppo.int/media/data/reporting/rs-2014-02-en.pdf> [accessed on 9 September 2020].
- EPPO RS (2014) EPPO Reporting Service No. 02. Num. Article 2014/023 Update on the situation of *Anoplophora glabripennis* in Lombardia region (IT). <https://gd.eppo.int/reporting/article-2743> [accessed on 14 October 2020].
- EPPO RS (2015) EPPO Reporting Service No. 07. Num. Article 2015/127 Updated situation of *Anoplophora glabripennis* in Canada. <https://gd.eppo.int/reporting/article-4925> [accessed on 9 September 2020].
- EPPO RS (2007) EPPO Reporting Service No. 09. Num. Article 2007/166 First record of *Anoplophora glabripennis* in Italy. <https://gd.eppo.int/reporting/article-1199> [accessed on 14 October 2020].
- EPPO RS (2020) EPPO Reporting Service No. 07. Num. Article 2020/140 *Anoplophora glabripennis* eradicated from Canada. <https://gd.eppo.int/reporting/article-4925> [accessed on 9 September 2020].
- Faccoli M & Favaro R (2016) Host preference and host colonisation of the Asian longhorned beetle, *Anoplophora glabripennis* (Coleoptera Cerambycidae), in Southern Europe. *Bulletin of Entomological Research* **106**, 359–367.
- Faccoli M & Gatto P (2016) Analysis of costs and benefits of Asian longhorned beetle eradication in Italy. *Forestry* **89**



, 301–309.

Faccoli M, Favaro R, Smith MT & Wu J (2015) Life history of the Asian longhorn beetle *Anoplophora glabripennis* (Coleoptera Cerambycidae) in southern Europe. *Agricultural and Forest Entomology* **17**(2), 188–196.

Faccoli M, Favaro R, Concheri G, Squartini A & Battisti A (2016) Tree colonisation by the Asian Longhorn Beetle, *Anoplophora glabripennis* (Motschulsky) (Coleoptera Cerambycidae): effect of habitat and tree suitability. *Insect Science* **23**, 288–296.

FAO (2018) ISPM 15 - Regulation of wood packaging material in international trade. Rome, IPPC, FAO.

Favaro R, Wichmann L, Ravn HP & Faccoli M (2015) Spatial spread and infestation risk assessment in the Asian longhorned beetle, *Anoplophora glabripennis*. *Entomologia Experimentalis et Applicata* **155**, 95–101.

Gao H, Yang X, Wei J & Lang X (1997) An investigation on the resistance of major forestation species to *Anoplophora glabripennis* and *A. nobilis*. *Journal of Northwest Forestry College* **12**, 42–46.

Gao RT, Qin XF, Chen DY & Chen WP (1993) [A study on the damage to poplar caused by *Anoplophora glabripennis*]. *Forest Research* **6**, 189–193 (in Chinese).

Haack RA (2006) Exotic bark- and wood-boring Coleoptera in the United States: Recent establishments and interceptions. *Canadian Journal of Forest Research* **36**, 269–88.

Haack RA, Law KR, Mastro VC, Ossenbruggen HS & Raimo BJ (1997) New York's battle with the Asian longhorned beetle. *Journal of Forestry* **95**, 11–15.

Haack RA, Bauer LS, Gao R-T, McCarthy JJ, Miller DL, *et al.* (2006) *Anoplophora glabripennis* within tree distribution, seasonal development, and host suitability in China and Chicago. *Great Lakes Entomologist* **39**, 169–83.

Haack RA, Hérard F, Sun J & Turgeon JJ (2010) Managing invasive populations of Asian longhorned beetle and citrus longhorned beetle: A worldwide perspective. *Annual Review of Entomology* **55**, 521–546.

Hajek AE & Kalb DM (2007) Suitability of *Acer saccharum* and *Acer pensylvanicum* (Aceraceae) for rearing *Anoplophora glabripennis* (Coleoptera: Cerambycidae). *The Canadian Entomologist* **139**, 751–755.

He P & Huang J (1993) Adult behavior of *Anoplophora glabripennis*. *Acta Entomologica Sinica* **36**, 51–55.

Hérard F, Ciampitti M, Maspero M, Krehan H, Benker U, Boegel C, Schrage R, Bouhot-Delduc L, & Bialooki P (2006) *Anoplophora* species in Europe: infestations and management processes. *EPPO Bulletin* **36**(3), 470–474.

Hérard F, Maspero M, Ramualde N, Jucker C, Colombo M, Ciampitti M, & Cavagna B (2009) *Anoplophora glabripennis* infestation (Col.: Cerambycidae) in Italy. *EPPO Bulletin* **39**(2), 146–152.

Hoyer-Tomiczek U, Sauseng G & Hoch G (2016) Scent detection dogs for the Asian longhorn beetle, *Anoplophora glabripennis*. *EPPO Bulletin* **46**(1), 148–155.

Hu J, Angeli S, Schuetz S, Luo Y & Hajek AE (2009) Ecology and management of exotic and endemic Asian longhorned beetle *Anoplophora glabripennis*. *Agricultural and Forest Entomology* **11**(4), 359–375.

Hua L, Li S & Zhang X (1992) *Coleoptera: Cerambycidae*. In: Peng J & Liu Y (eds). *Iconography of Forest Insects in Hunan China* Hunan Science and Technology Press, Changsha, pp. 467–524.

Javal M (2017) Invasion du capricorne asiatique *Anoplophora glabripennis*: génétique, traits d'histoire de vie et écologie. PhD Thesis, Sciences Agricoles, Université d'Orléans, France. 239 pp.

Keena MA (2002) *Anoplophora glabripennis* (Coleoptera: Cerambycidae) fecundity and longevity under laboratory conditions: comparison of populations from New York and Illinois on *Acer saccharum*. *Environmental Entomology* **31**, 490–98.

- Keena MA (2005) Pourable artificial diet for rearing *Anoplophora glabripennis* (Coleoptera: Cerambycidae) and methods to optimize larval survival and synchronize development. *Annals of the Entomological Society of America* **98**, 536–547.
- Keena MA (2006) Effects of temperature on *Anoplophora glabripennis* (Coleoptera: Cerambycidae) adult survival, reproduction, and egg hatch. *Environmental Entomology* **35**, 912–921.
- Li E & Wu C (1993) [*Integrated management of longhorn beetles damaging poplar trees*]. China Forest Press, Beijing (CN) (in Chinese).
- Liang CJ, Li GH, Li GW, Gao RT, Zhao ZY & Sun JZ (1997) [Study on the use of systemic and pyrethroid insecticides to control *Anoplophora glabripennis* and *Apriona germarii*]. *Forest Research* **10**, 189–193 (in Chinese).
- Lieu KOV (1945) The study of wood borers in China. I. Biology and control of the citrus-rootcerambycids, *Melanauster chinensis*, Forster (Coleoptera). *Florida Entomologist* **27**(4), 61–101.
- Lingafelter SW & Hoebeke ER (2002) Revision of the genus *Anoplophora* (Coleoptera: Cerambycidae) (No. 595.7648 L5). Washington, DC: Entomological Society of Washington. 236 pp.
- Liu SR, Zhu CX & Lu XP (1992) [Field trials of the control of control of cerambycid larvae with entomopathogenic nematodes]. *Chinese Journal of Biological Control* **8**, 176 (in Chinese).
- MacLeod A, Evans HF & Baker RHA (2002) An analysis of pest risk from an Asian longhorn beetle (*Anoplophora glabripennis*) to hardwood trees in the European community. *Crop Protection* **21**, 635–645
- Maspero M, Jucker C & Colombo M (2007) First record of *Anoplophora glabripennis* (Motschulsky) (Coleoptera Cerambycidae Lamiinae Lamiini) in Italy. *Bolletino di Zoologia Agraria e di Bachicoltura Ser. II* **39**, 161–164.
- Morewood WD, Neiner PR, McNeil JR, Sellmer JC & Hoover K (2003) Oviposition preference and larval performance of *Anoplophora glabripennis* (Coleoptera: Cerambycidae) in four eastern North American hardwood tree species. *Environmental Entomology* **32**, 1028–1034.
- Moussa Z & Cocquempot C (2017) *Anoplophora glabripennis* Motschulsky, 1854, a new introduced pest that could threaten hardwood trees in Lebanon (Coleoptera, Cerambycidae). *Bulletin de la Société Entomologique de France* **122** (4), 501–508.
- Nowak DJ, Pasek J, Sequeira R, Crane DE & Mastro V (2001) Potential effect of *Anoplophora glabripennis* (Coleoptera: Cerambycidae) on urban trees in the United States. *Journal of Economic Entomology* **94**(1), 116–122.
- Pan HY (2005) Review of the Asian Longhorned Beetle: Research, Biology, Distribution and Management in China. Forestry Department, Food and Agriculture Organization. Working Paper FBS/6E, Rome (Italy). 56 pp.
- Peng J & Liu Y (1992) [*Iconography of Forest Insects in Hunan, China*]. Hunan Forestry Department, Institute of Zoology, Academia Sinica (in Chinese).
- Pennacchio F, Peverieri GS, Jucker C, Allegro G & Roversi PF (2012) A key for the identification of larvae of *Anoplophora chinensis*, *Anoplophora glabripennis* and *Psacotha hilaris* (Coleoptera Cerambycidae Lamiinae) in Europe. *Redia* **95**, 57–65.
- Regione Lombardia (2020a) [Scheda informativa. \*Anoplophora chinensis\* e \*A. glabripennis\* \(Tarlo asiatico\)](#). [accessed on 9 September 2020].
- Regione Lombardia (2020b) [App FitoDetective](#). [accessed on 9 September 2020].
- Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants, amending Regulations (EU) No 228/2013, (EU) No 652/2014 and (EU) No 1143/2014 of the European Parliament and of the Council and repealing Council Directives 69/464/EEC, 74/647/EEC, 93/85/EEC,

98/57/EC, 2000/29/EC, 2006/91/EC and 2007/33/EC.

Ric J, De Groot P, Gasman B, Orr M, Doyle J, Smith MT, Dumouchel L, Scarr TA & Turgeon JJ (2007) Detecting signs and symptoms of Asian longhorned beetle injury: Training guide. Natural Resources Canada, Great Lakes Forestry Centre, Sault Ste. Marie, Ontario, Canadian Food Inspection Agency. 118 pp.

Qin XX, Gao RT, Li JZ, Cao GH & Chen WP (1996) [Integrated control of *Anoplophora glabripennis* by selection of insect resistant poplar species]. *Forest Research* **9**, 202–205 (in Chinese).

Sawyer A (2008) Asian longhorned beetle: annotated host list.

[https://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/asian\\_lhb/downloads/hostlist.pdf](https://www.aphis.usda.gov/plant_health/plant_pest_info/asian_lhb/downloads/hostlist.pdf) [accessed on 9 September 2020].

Smith MT, Bancroft J & Tropp J (2002) Age-specific fecundity of *Anoplophora glabripennis* (Coleoptera: Cerambycidae) on three tree species infested in the United States. *Environmental Entomology* **31**, 76–83.

Smith MT, Tobin PC, Bancroft J, Li G & Gao R (2004) Dispersal and spatiotemporal dynamics of Asian longhorned beetle (Coleoptera: Cerambycidae) in China. *Environmental Entomology* **33**, 435–442.

Smith MT, Turgeon JJ, de Groot P & Gasman B (2009) Asian longhorned beetle *Anoplophora glabripennis* (Motschulsky): lessons learned and opportunities to improve the process of eradication and management. *American Entomology* **55**, 21–25.

Sjöman H, Östberg J & Nilsson J (2014) Review of host trees for the wood-boring pests *Anoplophora glabripennis* and *Anoplophora chinensis*: an urban forest perspective. *Arboriculture & Urban Forestry* **40**(3), 143–164.

Sun JZ, Zhao ZY, Ru TQ, Qian ZG & Song XJ (1990) [Control of *Anoplophora glabripennis* by using cultural methods]. *Forest Pests and Diseases* **2**, 10–12 (in Chinese).

Thomas MC (2004) Pest Alert. A second Asian longhorned beetle in the U.S. Florida Department of Agriculture and Consumer Services, Division of Plant Industry, USA.

Tomiczek C & Hoyer-Tomiczek U (2007) Asian longhorned beetle (*Anoplophora glabripennis*) and citrus longhorned beetle (*Anoplophora chinensis*) in Europe - actual situation. *Forstschutz Aktuell* **38**, 2–5.

Turgeon JJ, Ric J, de Groot P, Gasman B, Orr M, Doyle J, Smith MT, Dumouchel L & Scarr T (2007) Détection des signes et des symptômes d'attaque par le longicorne étoilé: Guide de formation. Ottawa: Res. Nat. Can. 118 pp.

Turgeon JJ, Orr M, Grant C, Wu Y & Gasman B (2015) Decade-old satellite infestation of *Anoplophora glabripennis* Motschulsky (Coleoptera: Cerambycidae) found in Ontario, Canada outside regulated area of founder population. *The Coleopterists Bulletin* **69**, 674–678.

USDA (1998) [Asian long horn beetle web pages](#). [accessed on 9 September 2020].

Wang ZG (2004) Study on the occurrence dynamics of *Anoplophora glabripennis* (Coleoptera: Cerambycidae) and its control measures. PhD thesis. Northeast For. Univ., Harbin, China. 98 pp.

Wang B, Mastro V & Gao R (2005) Host range of *Anoplophora glabripennis*: what we've learned from common-garden experiment data. In Proc. 16th U.S. Department of Agriculture interagency research forum on gypsy moth and other invasive species 2005, ed. SLC Fosbroke, KW Gottschalk, p. 89. Newtown Square, PA, USDA For. Serv. Gen. Tech. Rpt. NE-GTR-337.

Williams DW, Lee HP & Kim IK (2004) Distribution and abundance of *Anoplophora glabripennis* (Coleoptera: Cerambycidae) in natural *Acer* stands in South Korea. *Environmental Entomology* **33**, 540–545.

Wong G & Mong M (1986) *Anoplophora glabripennis*. In [*Forest disease and Insect Prevention*] First edn (in Chinese).

Wu WW & Jiang SN (1998) [The *glabripennis* species group of the genus *Anoplophora* in China]. *Acta Entomologica Sinica* **41**, 284–290 (in Chinese).

Yan J & Qin X (1992) *Anoplophora glabripennis* (Motsch.). In *Forest Insects of China*, ed. G Xiao, pp. 455–57. Beijing: Chin. For. Publ. House.

Zhang A, Oliver JE, Aldrich JR, Wang B & Mastro VC (2002) Stimulatory beetle volatiles for the Asian longhorned beetle, *Anoplophora glabripennis* (Motschulsky). *Zeitschrift für Naturforschung* **57c**, 553–558.

Zhang A, Oliver JE, Chauhan K, Zhao B, Xia L & Xu L (2003) Evidence for contact sex recognition pheromone of the Asian longhorned beetle, *Anoplophora glabripennis* (Coleoptera: *Cerambycidae*). *Naturwissenschaften* **90**, 410–413.

## ACKNOWLEDGEMENTS

This datasheet was extensively revised in 2020 by Luana Giordano and Mariangela Ciampitti. Their valuable contribution is gratefully acknowledged.

### How to cite this datasheet?

EPPO (2024) *Anoplophora glabripennis*. EPPO datasheets on pests recommended for regulation. Available online. <https://gd.eppo.int>

### Datasheet history

This datasheet was first published in the EPPO Bulletin in 2009 and revised in 2020. It is now maintained in an electronic format in the EPPO Global Database. The sections on 'Identity', 'Hosts', and 'Geographical distribution' are automatically updated from the database. For other sections, the date of last revision is indicated on the right.

EPPO (2009) *Anoplophora glabripennis*. Datasheets on pests recommended for regulation. *EPPO Bulletin* **29**(4), 497-501. <https://doi.org/10.1111/j.1365-2338.1999.tb01426.x>



Co-funded by the  
European Union