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Anoplophora glabripennis Motschulsky, 1854, a new introduced pest that could threat hardwood trees in Lebanon (Coleoptera, Cerambycidae)

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Abstract. – The Asian longhorn beetle, *Anoplophora glabripennis* Motschulsky, 1854, was intercepted as invasive species in Lebanon. *Populus nigra* and *Salix baybilonica*, which are frequently used in landscaping gardens and windy lands, are the most susceptible host trees. No natural predators or parasitoids are reported for *A. glabripennis* in Lebanon. Based on this information, there is a high risk that this introduced species could be established in the country and threat the hardwood trees in urban and forest habitats. Set up quarantine regulations are very crucial to prohibit the importation of infested material and impose fumigation of all solid wood packaging materials infested.

Résumé. – ***Anoplophora glabripennis* Motschulsky, 1854, un nouveau ravageur pouvant menacer les arbres feuillus au Liban (Coleoptera, Cerambycidae)**. Le Longicorne asiatique *Anoplophora glabripennis* Motschulsky, 1854, a été intercepté comme espèce invasive au Liban. *Populus nigra* et *Salix baybilonica*, qui sont fréquemment utilisés dans les jardins et les terrains en plein vent, sont les arbres hôtes les plus sensibles aux attaques. Aucun prédateur naturel ni parasitoïde contre *A. glabripennis* n'est documenté au Liban. Sur la base de ces informations, le risque est très élevé que cette espèce s'installe dans le pays et menace les feuillus. Le suivi des mesures phytosanitaires de quarantaine s'impose afin de contrôler les importations de matériaux vecteurs et d'imposer le traitement curatif ou la destruction de tous les matériaux infestés importés.

Keywords. – Asian longhorned beetle, interception, potential risk, Near East.

The genus *Anoplophora* Hope, 1839 (Coleoptera, Cerambycidae) includes more than 40 species native to Asia. According to Weiwen & Shunan (1998), Lingafelter & Hoebeke (2002), Ohbayashi *et al*. (2009a), Löbl & Smetana (2010) and Danilevsky (2017), and looking Chang (1960), Duranton (2004), Ohbayashi *et al.* (2009b) and Xie *et al*. (2012) the true number of species is not well defined and must be estimated between 39 to 45 species.

All species of the genus are xylophagous attacking mainly deciduous trees but also some coniferous (Lingafelter & Hoebeke, 2002). Several species are dangerous pests in their native areas. *Anoplophora glabripennis* Motschulsky, 1857 [Asian Longhorned Beetle (ALB)] and *A. chinensis* (Forster, 1771) [Citrus Longhorned Beetle (CLB) quoted as *A. malasiaca* (Thomson, 1865) now synonym], are quarantine or forbidden species in Australia, Canada, Europe, New Zealand and United States. These species have been intercepted, and introduced in Europe and North America where eradication process is sometimes successfull but mainly still ongoing (CABI, 2017).

***Interceptions of* Anoplophora glabripennis *in Lebanon*.** – Until now there is no occurrence of an *Anoplophora* specimen in Lebanon (Cocquempot *et al*., 2016; Danilevsky, 2017). *A. glabripennis* was quoted recently from Turkey at Zeytinburnu in the European part of Istanbul (Ayberk *et al*., 2014) but this information was not confirmed by Turkish NPPO and the species is still officially absent from Turkey (EPPO, 2015), in spite Ayberk & Uyar (2015) confirm this interception. Sahin (2016) finally denies and corrects these information, asserting that it was a misidentification and that these information concerned *Anoplophora chinensis* as finding in a nursery

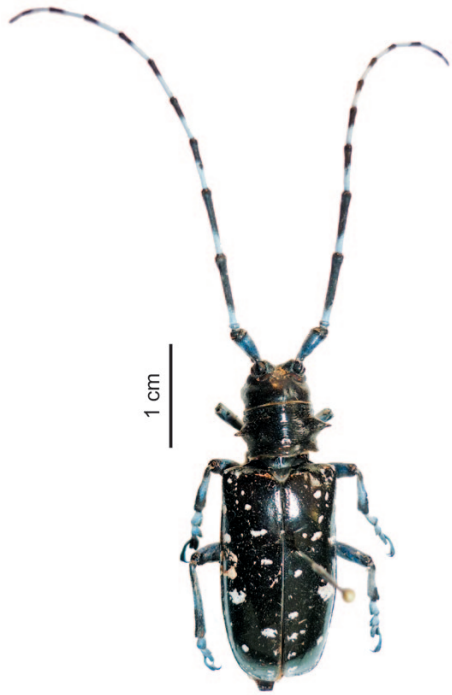

Fig. 1. – *Anoplophora glabripennis* Motschulsky, female from Aabrine (Lebanon).

of Kumbaba (East of Istanbul in Asian part, on the coast of the Black See) (Hizal *et al*., 2015).

One specimen of *Anoplophora glabripennis* (fig. 1) (Z. Moussa and C. Cocquempot det.) was found in an urban area of Aabrine (North Lebanon) in 2015, June 1st (fig. 2) (34°15'17.71''N - 35°42'5.35''E), another one was found one week later. The year after, on 2016, July 13th, one other specimen was spotted in the same area. All these specimens are typically with large body from 31 to 32 mm in length. The antennae reach 1.5 times the body length which means that they are all females (Lingafelter & Hoebeke, 2002; Meng *et al*. 2015). It is the first interceptions of this species for Lebanon and all the Near East.

This record over two successive years, exactly at the same place, means that it is probably an introduction but not yet an establishment since no monitoring was done to determine the area and the level of infestation.

Hypothesis of the origin of ALB in Aabrine. – The Asian longhorn beetle was accidently imported to Lebanon following two possible pathways. The importation of infested ornamental trees seems to be improbable and we believe, that as for almost all cases, it is the main known pathway using infested wood packaging material which happens in Aabrine. Looking at the surroundings of Aabrine, it is not possible for the specimens to come here by natural spreading and fly. It means the infestation comes from transport by road with wood packaging used for industrial material or heavy products for works as granite by example. There's no factory which could import industrial material and we have not seen any works (new road, new large building or factory and no fitting out of the town) which could necessitate heavy material as natural cut stones as in France for example. The small airport in Wuajh Al Hajar is a military base and cannot be the importation site. Tripoli harbour is an important place for international trade and could be the original place of importation, but an introduction from Beirut harbour or airport cannot be excluded and must looked as a serious hypothesis.

Another possibility to explain the occurrence two successive years in the same place is the storage of wood packaging salvaged on a logistical platform or industrial site to be used as heating wood or other secondary use as it was done sometimes in U.S.A. and Germany.

A meticulous monitoring and investigation would be necessary to know exactly the reason of the presence of ALB in Aabrine, but it was impossible until now. We think also, that ALB could occurs in other sites in Lebanon, following the same importation origin of infested material in Aabrine.

***Some recalls about* Anoplophora glabripennis**. – This species was well studied according its pest status and its world spreading as dangerous invasive species since the end of last century. The Asian longhorned beetle is native to China and Korea (Cavey *et al*., 1998 ; Lingafelter & Hoebeke, 2002; Williams *et al*. 2004a). Worldwide, one or several interceptions and introductions were reported in United States of America (Haack *et al*., 1996; MacLeod, 1997; MacLeod

et al., 2002; Cavey *et al*., 1998; Poland *et al*., 1998; Haack, 2006; Dodds & Orwig, 2011; CABI, 2017) and later in Canada (Hopkin *et al.,* 2004; CABI, 2017). It has been intercepted or introduced in European countries including Austria, Germany, France, Italy (Maspero *et al*., 2007; Cocquempot & Lindelöw, 2010), Belgium (OEPP, 2009), Switzerland (OEPP, 2011; Forster & Wermelinger, 2012), England (Lewis, 1999; OEPP, 2012), Czech (CABI, 2017), The Netherlands (OEPP, 2010; Loomans *et al*., 2013), Finland (OEPP, 2015) and Denmark (Scheel, 2009). The report from Poland (Białooki, 2003) concerned *A. chinensis* as those from Turkey (Ayberk *et al*., 2014; Sahin, 2016). However, it was detected in Japan in 2002 (Takahashi & Ito, 2005; CABI, 2017). All these interceptions have been followed by monitoring and eradication process but not all are successful and many are still ongoing.

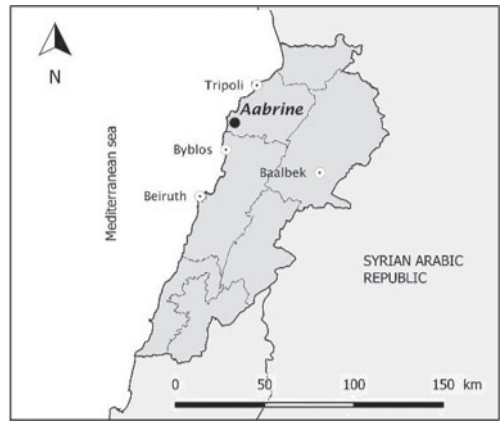

Fig. 2. – Map of Lebanon with site of discovery (Aabrine) for *Anoplophora glabripennis* Motschulsky.

Anoplophora glabripennis, *a dangerous pest*. – However, the most dangerous longhorn species listed in the Lebanese fauna are belonging to the genus *Cerambyx* Linnaeus, 1758 (Cocquempot *et al*., 2016) because they attack mainly stone fruit trees.

Several longhorn species were introduced or established in Lebanon: *Phoracantha semi-punctata* (Fabricius, 1775) and *P. recurva* Newman, 1840, *Batocera rufomaculata* Degeer, 1775, and we do not exclude that *Arhopalus ferus* (Mulsant, 1839) was also an old introduced species. Recently, one specimen of *Monochamus sutor sutor* (Linnaeus, 1758), was reported in Lebanon indicating the high risk of introduction of new species by wood packing material or imported timbers (Moussa *et al*., 2016).

A. glabripennis is considered as destructive species because, unlike other cerambycid, it has a broad host range and can attack healthy as well as trees under stress (Gaag & Loomans, 2014; Sjöman *et al*., 2014; CABI, 2017). In addition, it spends most of its life at larval stage boring inside trunks and large branches without visual symptoms (Hu *et al*., 2009; Meng *et al*., 2015). According to Li & Wu (1993), Keena (2002), Smith *et al*. (2002), Haack *et al*. (2010) and Meng *et al*. (2015), this species causes double damages to infected trees: first when adult females feed on leaves and twigs for ovarian maturation causing damage to living trees and second when larvae feed on the vascular system of crown and main branches causing severe damage and eventually leading to the death of the infected trees. However, adult males have mature spermatozoa before emergence and feeding is necessary only to sustain their normal activity (Hu *et al*., 2009).

Once introduced and established, the Asian longhorn beetle is more likely to be found along the border than inside the forest (Liu *et al*., 2012). Smith *et al*. (2001a) have studied the dispersal of the beetle and found that adult beetles are short fliers and do not disperse far when surrounded by host trees but the flight can be longer if host trees are lacking near the emergency point. Huang (1991) shows that high canopy density and high vegetation coverage reduce the movement of the beetle. However, in mixed stands, their distribution can vary according to the composition of tree species (Wang *et al*., 2006).

According to MacLeod *et al*. (2002), *A. glabripennis* could establish almost all over the world and may cause serious damages to important hardwood forests, urban trees, industrial trees and some fruit tree species.

Lebanon is located at the eastern edge of the Mediterranean, covering a small area of 10,452 km^2. The country is characterized by a high biodiversity in term of species-area ratio due to its geographic location and its mountainous topography creating different microclimates (UNEP/MoE, 2015). The National Forest Assessement (NFA) estimates the forest area of Lebanon at 13.3 % of the total area of the country and other wooded land of about 10 % (Beydoun & Estephan, 2005). Broadleaved forest occupies the largest area of about 56.6 %, coniferous constitute 32.2 % and mixed forests cover 11.2 % of the total forest area (Beydoun & Estephan, 2005). In broadleaved forests, *Quercus calliprinos* Webb, *Q. cerris* L. and *Q. infectoria* Oliv. (Fagaceae) are dominant. In coniferous forests, *Pinus brutia* Tenore and *P. pinea* L. are the most common, followed by *Pinus halepensis* Miller (Pinaceae), *Juniperus excelsea* M. Bieb., *Cupressus sempervirens* L. (Cupressaceae), *Cedrus libani* A. Rich. and *Abies cilicica* (Antoine & Kotschy) Carrière (Pinaceae).

Native Oaks and coniferous species in Lebanon are probably not favourable to ALB and the main risk of damages in forests concerns less common tree species (FAO, 2005) as : *Acer hermoneum* (Bornm.) Schwer., *A. obtusifolium* Sm., *A. hyrcanum tauricolum* (Boiss. & Balansa) Yalt. (Sapindaceae), *Alnus orientalis* Decne, *Ostrya carpinifolia* Scop. (Betulaceae), *Arbutus andrachne* L. (Ericaceae), *Celtis australis* L. (Ulmaceae), *Ceratonia siliqua* L., *Cercis siliquastrum* L. (Fabaceae), *Eucalyptus spp*. (Myrtaceae), *Ficus sycomorus* L. (Moraceae), *Fraxinus ornus* L., *F. syriacum* Boissier (Oleaceae), *Juglans regia* L. (Juglandaceae), *Laurus nobilis* L. (Lauraceae), *Quercus boissieri* Reuter (= *Q. microphylla* Thiebaut) (Fagaceae), *Platanus orientalis* L. (Platanaceae), *Populus alba* L., *P. nigra* L., *P. tremula* L., *Salix baybilonica* L., (Salicaceae), *Sorbus flabellifolia* (Spach) Schauer (uncertain status), *S. torminalis* (L.) Crantz (Rosaceae) and *Styrax officinalis* L. (Styracaceae). The main fruit trees used in agriculture lands in Lebanon that seem not to be the favourite species for ALB are: *Olea europea* L. (Oleaceae), *Citrus spp*. (Rutaceae), *Malus spp*., *Pyrus syriaca* Boissier, *Prunus amygdalis agrestis* Boissier and *P. ursina* Kotschy (uncertain status) (Rosaceae) (Beydoun & Estephan, 2005). Some ornamental tree species introduced for landscaping, among them *Tilia spp*. (Tiliaceae), *Acacia spp*. (Mimosaceae), *Casuarina equisetifolia* L. (Casuarinaceae) and *Jacaranda mimosifolia* Don (Bignoniaceae) (Dalsgaard, 2005), could be also potential hosts.

Lebanon has mainly a Mediterranean climate, with warm, dry summers, and cool, wet winters. Most rainfalls are irregular and occur in short periods between November and March. According to FAO (2008), the increase in temperature and the decrease in precipitation due to climate change have notable impact on forest through expansion of insect species range and increased frequency of forest fires. The percentage of the forest area in Lebanon affected by fire is about 14.1 % (or 19,652 ha) of which 99.9% are limited to coniferous forests (Dalsgaard, 2005). In addition, forests in Lebanon have long been subject to degradation and fragmentation due to human activities like urbanization, agriculture, overharvesting, and overgrazing. In total, the loss in forest is estimated about 35% of the forest (UNEP/MoE, 2015). Those factors have obviously a negative impact on forest ecosystems and increase the susceptibility of disturbances such insect pests or pathogens

The risk of establishment of *A. glabripennis* is very high in Lebanon. According to Keena (2006), the estimated optimum temperature for median longevity of the beetle is 18°C, and the upper and lower thresholds are 39 and -3°C for females and 38 and -2°C for males respectively. These indicate that summer temperatures of Lebanon are favourable for the survival and the reproduction of *A. glabripennis*, especially in areas where host trees are available in addition to the absence of the natural enemies. However, the warm winters over the past half century may increase overwinter survival of the insect and decrease their chance of mortality.

Anoplophora glabripennis *and the biodiversity impact in Lebanon*. – The introduction of *A. glabripennis* in Lebanon may obviously have a negative impact on the biodiversity of the country. This new invasive species is able to establish because of its strong adaptability and broad host range. Once the beetle established breeding populations and spread rapidly in the country, it could significantly impact the natural hardwood forests and seriously threat the biodiversity. The less common species (*Acer spp*.) and the floodplain trees (*Populus spp*. and *Salix spp*.) could be impacted seriously. If the beetle spreads among the urban areas, it could threat poplars, plane trees, eucalyptus and other ornamental and deciduous fruit trees (Nowak *et al.*, 2001). Since the beetle remains virtually invisible in infested trees for up to one year (Hu *et al*., 2009; Meng *et al*., 2015), early detection becomes difficult.

Conclusion

A. glabripennis is considered a serious pest risk in Lebanon. Since the beetle was detected for two consecutive years in the same location, the possibility of mating, breeding and establishing in the surrounding areas is very high and new infestations might be expected in the near future. Moreover, forest ecosystems of Lebanon are facing decline and stress due to the climate change and human activities. Rouault *et al*. (2006) demonstrated that woodborers are positively influenced by drought and high temperature; in addition, fire and prolonged water stress decrease the host tree resistance. This situation may pose real problems on forests in Lebanon and promote the outbreak of this alien woodborer. According to Wargo (1996) and Ayres *et al*. (2000), the impact of the secondary agents on forest ecosystems may be greater than the impact of the initial stress.

Facing this problem, and to minimize the potential pathways of *A. glabripennis*, Lebanon should implement the International Standards for Phytosanitary Measures (ISPM) 15 regulations from IPPC (2016). In addition, maintaining public awareness and establishing domestic quarantine regulations that prohibit the transport of potentially infested wood and wood products, and impose fumigation of Solid Wood-Packaging Material (SWPM) from areas where *A. glabripennis* infestations have been detected, are required. A rapid action by cutting and burning infected trees and adjacent healthy trees with high risk within the infestation area is an important approach for a successful eradication to prevent future loss in biodiversity.

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References

Ayberk H., Özdikmen H. & Cebeci H., 2014. – A serious pest alert for Turkey: a newly introduced invasive longhorned beetle, *Anoplophora glabripennis* (Cerambycidae: Lamiinae). *Florida Entomologist,* **97** (4) : 1852-1855.

Ayberk H. & Uyar Ç., 2015. – A new recorded pest for Turkey (*Anoplophora glabripennis* Motschulsky, 1854) (Cerambycidae, Lamiinae) and its biological control. 4th International Conference of Eco-friendly Applied Biological Control of Agricultural Pests and Phytopathogens, Kahire, MISIR, 19-22 Ekim 2015 : 80.

Ayres M. & Lombardero M., 2000. – Assessing the consequences of global change for forest disturbance from herbivores and pathogens. *Science of Total Environment,* **262** : 263-286.

Beydoun G. Y. & Estephan J., 2005. – *National Forest Assessment Program Lebanon. Data Analysis Report*. Beyrut : Republic of Lebanon, Ministry of Agriculture, 82 p.

Białooki P., 2003. – *Anoplophora glabripennis* (Motschulsky) (Coleoptera: Cerambycidae) – pierwsze stwierdzenie w Polsce. *Ochrona Roślin,* **2003** (11) : 34-35.

CABI, 2017. – Datasheet *Anoplophora glabripennis* (Asian longhorned beetle). Online version, updated 1.II.2017.

Cavey J. F., Hoebeke E. R., Passoa S. & Lingafelter S. W., 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.

Chang S. C., 1960. – New and unrecorded species of longicorn beetles from Taiwan (I). *Bulletin of Plant Pathology & Entomology,* **11** (3/4) : 1-7.

Cocquempot C. & Lindelöw Å., 2010. – Longhorn beetles (Coleoptera, Cerambycidae). Chapter 8.I. *Biorisk,* **4** (1) : 193-218.

Cocquempot C., Nemer N., Brustel H. & Tanios C., 2016. – Nouvelles données et nouveau catalogue des Coléoptères Cerambycidae du Liban (Coleoptera, Cerambycoidea). *Bulletin de la Société entomologique de France,* **121** (1) : 92-104.

Dalsgaard S., 2005. – *National Forest and Tree Assessment and Inventory. TCP/LEB/2903. Final report*. Ministry of Agriculture, Lebanon / Food and Agriculture Organization of the United Nations, Beirut, 112 p.

Danilevsky M. L., 2017. – *Catalogue of Palaearctic Cerambycoidea*. Online version, updated 5.V.2017. http://www.cerambycidae.net/catalog.pdf : 256 p.

Dodds K. J. & Orwig D. A., 2011. – An invasive urban forest pest invades natural environments - Asian longhorned beetle in northeastern US hardwood forests. *Canadian Journal of Forest Research,* **41** : 1729-1742.

Duranton G., 2004. – Une nouvelle espèce dans le genre *Anoplophora* Hope, 1839 - *Anoplophora sebastieni* n. sp. (Cerambycidae, Lamiinae, Lamiini). *Besoiro,* **10** : 2-4.

EPPO, 2015. – *Reporting Service no. 04 – 2015*. article: 2015/068. Online version, updated IV.2015. http://archives.eppo.int/EPPOReporting/2015/Rse-1504.pdf.

Food & Agriculture Organization of the United Nations (FAO), 2005. – *Global Forest Resources Assessment. Country Reports. Lebanon. FRA/2005/059*. Rome : FAO, 34 p.

—— 2008. – *Forest Health and Biosecurity Working Papers. Climate change impact on forest health. FBS/9E*. Rome : FAO, 39 p.

Forster B. & Wermelinger B., 2012. – First records and reproductions of the Asian longhorned beetle *Anoplophora glabripennis* (Motschulsky) (Coleoptera, Cerambycidae) in Switzerland. *Bulletin de la Société entomologique suisse,* **85** : 267-275.

Gaag D. J. van der & Loomans A. J. M., 2014. – Host plants of *Anoplophora glabripennis*, a review. *Bulletin OEPP/EPPO Bulletin*, 44 (3) : 518-528.

Haack R. A., 2006. – Exotic bark- and wood-boring Coleoptera in the United States : recent establishments and interceptions. *Canadian Journal of Forest Research,* **36** : 269-288.

Haack R. A., Cavey J. F., Hoebeke R. E. & Law K. R., 1996. – *Anoplophora glabripennis* : a new tree-infesting exotic cerambycid invades New York. *Newsletter of the Michigan entomological Society,* **41** (2-3) : 1-3

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

Hizal E., Arslangündoğdu Z., Göç A. & Ak M., 2015. – Türkiye istilacı yabancı böcek faunasına yeni bir kayıt *Anoplophora chinensis* (Forster, 1771) (Coleoptera: Cerambycidae). *Journal of the Faculty of Forestry Istanbul University,* **65** (1) : 7-11.

Hopkin A., De Groot P. & Turgeon J. J., 2004. – Alien forest insects: What's bugging us in Ontario? Emerald ash borer and Asian longhorned beetle. *Forest Health and Biodiversity News,* **8** : 1-2, 5.

Hu J., Angeli S., Schuetz S., Luo Y. & Hajek A. E., 2009. – Ecology and management of exotic and endemic Asian longhorned beetle *Anoplophora glabripennis*. *Agricultural and Forest Entomology,* **11** : 359-375.

Huang J., 1991. – Current status and problems in the control of poplar wood-boring insect pests. *Journal of Forest Diseases and Insect Pests,* **1** : 52-56.

International Plant Protection Convention (IPPC), 2016. – *Regulation of wood packaging material in international trade.* Rome : Secretariat of the International Plant Protection Convention (IPPC), Food and Agriculture Organization of The United Nations (FAO), 22 p.

Keena M. A., 2002. – *Anoplophora glabripennis* (Coleoptera: Cerambycidae) fecundity and longevity under laboratory conditions: comparison of populations from New York and Illinois on *Acer saccharum*. *Environmental Ecology,* **31** (3) : 490-498.

—— 2006. – Effects of Temperature on *Anoplophora glabripennis* (Coleoptera: Cerambycidae). Adult survival, reproduction, and egg hatch. *Environmental Entomology,* **35** (4) : 912-921.

Lewis K. C., 1999. – *Anoplophora glabripennis* (Cerambycidae) in the British Isles. *Bulletin of The Amateur Entomologist's Society,* **58** (425) : 162.

Li W. & Wu C., 1993. – *Integrated Management of Longhorn Beetles Damaging Poplar Trees*. Beijing : Forest Press.

Lingafelter S. W. & Hoebeke E. R., 2002. – *Revision of* Anoplophora *(Coleoptera: Cerambycidae)*. Washington D.C. : Entomological Society of Washington, 236 p.

Liu Y., Wei G., Wu G. & Zhou C., 2012. – Influencing factors of quantity distribution of *Anoplophora glabripennis* in poplar forest. *Journal of Inner Mongolia Forestry Science and Technology,* **38** : 60-61.

Löbl I. & Smetana A., 2010. – Chrysomeloidea. *Catalogue of Palaearctic Coleoptera,* **6**. Stenstrup : Apollo Books, 924 p.

Loomans A. J. M., Wessels-Berk B. F., Copini P., Mentink N. J. B., Hoop M. B. de & Hartog W. G. S. A. den, 2013. – Import-inspections, surveys, detection and eradication of the longhorn beetles *Anoplophora chinensis* and *A. glabripennis* in The Netherlands. *Journal of entomological and acarological Research,* **45** (supplement) : 8.

MacLeod A., 1997. – *Pest risk analysis for* Anoplophora glabripennis *(Motschulsky). Proposal for addition to the EPPO A1 list of quarantine pests*. Sand Hutton, York : Central Science Laboratory, 20 p.

MacLeod A., Evans H. F. & Baker R. H. A., 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 de Zoologia agraria y Bachiccoltulra,* **39** (2) : 161-164.

Meng P. S., Hoover K. & Keena M. A., 2015. – Asian longhorned beetle (Coleoptera: Cerambycidae), an introduced pest of maple and other hardwood trees in North America and Europe. *Journal of Integrated Pest Management,* **6** (4) : 1-13.

Moussa Z., Cocquempot C. & Yammouni D., 2016. – First detection of *Monochamus sutor sutor* (Linnaeus, 1758) in Lebanon (Coleoptera, Cerambycidae, Lamiinae). *Bulletin de la Société entomologique de France,* **121** (4) : 455-460.

Nowak D. J., Pasek J. E., Sequeira R. A., Crane D. E. & Mastro V. C., 2001. – Potential effect of *Anoplophora glabripennis* (Coleoptera : Cerambycidae) on urban trees in the United States. *Journal of Enonomic Entomology,* **94** (1) : 116-122.

OEPP Service d'information, 2009. – Premier signalement d'*Anoplophora glabripennis* en Belgique. Note 2009/043.

—— 2010. – Premier signalement d'*Anoplophora glabripennis* aux Pays-Bas. Note 2010/200.

—— 2011. – Premier signalement d'*Anoplophora glabripennis* en Suisse. Note 2011/189.

—— 2012. – Premier foyer d'*Anoplophora glabipennis* au Royaume-Uni. Note 2012/069.

—— 2015. – Premier signalement d'*Anoplophora glabripennis* en Finlande. Note 2015/184.

Ohbayashi N., Niisato T. & Chou W. I., 2009a. – Note on *Anoplophora wusheana* Chang from Taiwan (Coleoptera, Cerambycidae, Lamiinae). *Special Bulletin Japanese Society of Coleopterology,* **7** : 325-328.

Ohbayashi N., Ogawa J. & Su Z. H., 2009b. – Phylogenetic analysis of the Lamiine genus *Anoplophora* and its relatives (Coleoptera, Cerambycidae) based on the mitochondrial COI gene. *Special Bulletin Japanese Society of Coleopterology,* **7** : 309-324.

Poland T. M., Haack R. A. & Petrice T. R., 1998. – Chicago joins New York in battle with the Asian longhorned beetle. *Newsletter of the Michigan Entomological Society,* **43** : 15-17.

Rouault G., Candou J. N., Lieuthier F., Nageleisen L. M., Martin J. C. & Warzee N., 2006. – Effects of drought and heat on forest insect populations in relation to the 2003 drought in Western Europe. *Annal of Forest Science,* **63** : 613-624.

Sahin M., 2016. – Phytosanitary status of Citrus longhorn beetle (*Anoplophora chinensis*, Coleoptera: Cerambycidae) and Asian longhorn beetle (*Anoplophora glabripennis* Motschulsky) in Turkey. Datasheet from T.C. Ministry of Food Agriculture and Livestock. General Directorate of Food and Control, 7.IV.2016 : 1-2.

Scheel C., 2009. – *Anoplophora glabripennis* first finding in wood packaging material in Denmark. *Bulletin OEPP/EPPO Bulletin,* **39** : 153-154.

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.

Smith M. T., Bancroft J. S., Li G., Gao R. & Teale S. A., 2001a. – Dispersal of *Anoplophora glabripennis* (Cerambycidae). *Environmental Entomology,* **30** (6) : 1036-1040.

Smith M. T., Bancroft J. S. & 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.

Takahashi N. & Ito M., 2005. – Detection and eradication of the Asian longhorned beetle in Yokohama, Japan. *Research Bulletin of the Plant Protection Service,* **41** : 83-85.

UNEP/MoE, 2015. – Fifth National Report of Lebanon to the convention on Biological Diversity, 146 p.

Wang T., Wen J. B., Luo Y. Q., Xu Z. C. & Kari H., 2006. – Geostatistical study on the spatial pattern of *Anoplophora glabripennis* in three types of stands. *Acta ecologica sinica,* **26** : 3041-3048.

Wargo P., 1996. – Consequences of environmental stress on oak predisposition to pathogens. *Annals of Forest Science,* **53** : 359-368.

Weiwen W. & Shunan J., 1998. – The *glabripennis* species group of the genus *Anoplophora* in China (Coleoptera: Cerambycidae). *Acta entomologica sinica,* **41** (3) : 284-290.

Williams D. W., Lee H. & Kim I., 2004a. – Distribution and abundance of *Anoplophora glabripennis* (Coleoptera: Cerambycidae) in natural *Acer* stands in South Korea. *Environmental Entomology,* **33** : 540-545.

Xie G. L., Shi F. M. & Wang W. K., 2012. – An unusual new species of *Anoplophora* Hope, 1839 (Coleoptera: Cerambycidae) from Guizhou, China). *Far Eastern Entomologist,* **248** : 1-4.