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Pest categorisation of *Diaprepes abbreviatus*

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Abstract

The EFSA Panel on Plant Health performed a pest categorisation of the citrus root weevil *Diaprepes abbreviatus* (L.) (Coleoptera: Curculionidae) for the European Union (EU) following the commodity risk assessment of *Ligustrum delavayanum* topiary grafted on *L. japonicum* plants from the UK in which *D. abbreviatus* was identified as a relevant non-regulated EU pest which could potentially enter the EU. This species is native to the Caribbean and was introduced to the continental USA in 1964, to Gran Canaria (Spain) in 2014 and to Madeira Island (Portugal) in 2018. It is a polyphagous insect, associated with more than 270 species in 60 plant families. Female *D. abbreviatus* can lay up to 5,000 eggs in clusters within leaves folded and glued together. Neonate larvae drop off the leaves onto the ground and enter the soil, where they feed on roots for several months. The mature larvae pupate in the soil. After emergence, adults usually stay on the first host plant they encounter and can move long distances on nursery stock. *D. abbreviatus* is not a regulated pest in the EU. It could enter and spread within the EU via the import and movement of host plants for planting, cut flowers and soil. Some host plants for planting (e.g. *Vitis* spp., *Citrus* spp.), and soil are prohibited from entering the EU from countries where this weevil is known to occur. The import of other host plants for planting and cut flowers is subject to phytosanitary certificate and that of soil attached to machinery is regulated. Host availability and climate suitability suggest that the southernmost coastal areas of southern EU MSs would be suitable for establishment of *D. abbreviatus*. Temporary establishment in greenhouses in other EU territories would be possible. The introduction of *D. abbreviatus* would likely cause impacts. Measures to prevent entry, spread and impact are available. *D. abbreviatus* satisfies all the criteria that are within the remit of EFSA to assess for it to be regarded as a potential Union quarantine pest.

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Table of contents

Abstract.....	1
1. Introduction.....	4
1.1. Background and terms of reference as provided by the requestor.....	4
1.1.1. Background.....	4
1.1.2. Terms of reference.....	4
1.2. Interpretation of the terms of reference.....	4
1.3. Additional information.....	5
2. Data and methodologies.....	5
2.1. Data.....	5
2.1.1. Information on pest status from NPPOs.....	5
2.1.2. Literature search.....	5
2.1.3. Database search.....	5
2.2. Methodologies.....	5
3. Pest categorisation.....	6
3.1. Identity and biology of the pest.....	6
3.1.1. Identity and taxonomy.....	6
3.1.2. Biology of the pest.....	7
3.1.3. Host range/species affected.....	7
3.1.4. Intraspecific diversity.....	8
3.1.5. Detection and identification of the pest.....	8
3.2. Pest distribution.....	9
3.2.1. Pest distribution outside the EU.....	9
3.2.2. Pest distribution in the EU.....	10
3.3. Regulatory status.....	10
3.3.1. Commission Implementing Regulation 2019/2072.....	10
3.3.2. Hosts or species affected that are prohibited from entering the Union from third countries.....	11
3.3.3. Legislation addressing the organisms vectored by <i>D. abbreviatus</i> (Commission Implementing Regulation 2019/2072).....	11
3.4. Entry, establishment and spread in the EU.....	12
3.4.1. Entry.....	12
3.4.2. Establishment.....	13
3.4.2.1. EU distribution of main host plants.....	13
3.4.2.2. Climatic conditions affecting establishment.....	14
3.4.3. Spread.....	15
3.5. Impacts.....	15
3.6. Available measures and their limitations.....	15
3.6.1. Identification of potential additional measures.....	15
3.6.1.1. Additional potential risk reduction options.....	15
3.6.1.2. Additional supporting measures.....	16
3.6.1.3. Biological or technical factors limiting the effectiveness of measures.....	17
3.7. Uncertainty.....	18
4. Conclusions.....	18
References.....	19
Abbreviations.....	20
Glossary.....	21
Appendix A – <i>Diaprepes abbreviatus</i> host plants/species affected.....	22
Appendix B – Distribution of <i>Diaprepes abbreviatus</i>	36
Appendix C – Response of the Spanish NPPO about the status of <i>Diaprepes abbreviatus</i>	38
Appendix D – Response of the Swedish NPPO about the status of <i>Diaprepes abbreviatus</i>	40
Appendix E – Response of the Portuguese NPPO about the status of <i>Diaprepes abbreviatus</i>	41
Appendix F – Methodological note for the climatic modelling of Europe and Florida in relation to <i>D. abbreviatus</i> thermal thresholds.....	42

1. Introduction

1.1. Background and terms of reference as provided by the requestor

1.1.1. Background

The new Plant Health Regulation (EU) 2016/2031, on the protective measures against pests of plants, is applying from 14 December 2019. Conditions are laid down in this legislation in order for pests to qualify for listing as Union quarantine pests, protected zone quarantine pests or Union regulated non-quarantine pests. The lists of the EU regulated pests together with the associated import or internal movement requirements of commodities are included in Commission Implementing Regulation (EU) 2019/2072. Additionally, as stipulated in the Commission Implementing Regulation 2018/2019, certain commodities are provisionally prohibited to enter in the EU (high risk plants, HRP). EFSA is performing the risk assessment of the dossiers submitted by exporting to the EU countries of the HRP commodities, as stipulated in Commission Implementing Regulation 2018/2018. Furthermore, EFSA has evaluated a number of requests from exporting to the EU countries for derogations from specific EU import requirements.

In line with the principles of the new plant health law, the European Commission with the Member States are discussing monthly the reports of the interceptions and the outbreaks of pests notified by the Member States. Notifications of an imminent danger from pests that may fulfil the conditions for inclusion in the list of the Union quarantine pest are included. Furthermore, EFSA has been performing horizon scanning of media and literature.

As a follow-up of the above-mentioned activities (reporting of interceptions and outbreaks, HRP, derogation requests and horizon scanning), a number of pests of concern have been identified. EFSA is requested to provide scientific opinions for these pests, in view of their potential inclusion by the risk manager in the lists of Commission Implementing Regulation (EU) 2019/2072 and the inclusion of specific import requirements for relevant host commodities, when deemed necessary by the risk manager.

1.1.2. Terms of reference

EFSA is requested, pursuant to Article 29(1) of Regulation (EC) No 178/2002, to provide scientific opinions in the field of plant health.

EFSA is requested to deliver 53 pest categorisations for the pests listed in Annex 1A, 1B, 1D and 1E (for more details see mandate M-2021-00027 on the [Open.EFSA](#) portal). Additionally, EFSA is requested to perform pest categorisations for the pests so far not regulated in the EU, identified as pests potentially associated with a commodity in the commodity risk assessments of the HRP dossiers (Annex 1C; for more details see mandate M-2021-00027 on the [Open.EFSA](#) portal). Such pest categorisations are needed in the case where there are not available risk assessments for the EU.

When the pests of Annex 1A are qualifying as potential Union quarantine pests, EFSA should proceed to phase 2 risk assessment. The opinions should address entry pathways, spread, establishment, impact and include a risk reduction options analysis.

Additionally, EFSA is requested to develop further the quantitative methodology currently followed for risk assessment, in order to have the possibility to deliver an express risk assessment methodology. Such methodological development should take into account the EFSA Plant Health Panel Guidance on quantitative pest risk assessment and the experience obtained during its implementation for the Union candidate priority pests and for the likelihood of pest freedom at entry for the commodity risk assessment of High Risk Plants.

1.2. Interpretation of the terms of reference

Diaprepes abbreviatus is one of a number of pests listed in Annex 1C to the Terms of Reference (ToRs) to be subject to pest categorisation to determine whether it fulfils the criteria of a potential Union quarantine pest (QP) for the area of the EU excluding Ceuta, Melilla and the outermost regions of Member States referred to in Article 355(1) of the Treaty on the Functioning of the European Union (TFEU), other than Madeira and the Azores, and so inform EU decision making as to its appropriateness for potential inclusion in the lists of pests of Commission Implementing Regulation (EU) 2019/2072. If a pest fulfils the criteria to be potentially listed as a Union QP, risk reduction options will be identified.

1.3. Additional information

This pest categorisation was initiated following the commodity risk assessment of *Ligustrum delavayanum* topiary grafted on *Ligustrum japonicum* plants from the UK performed by EFSA (EFSA PLH Panel, 2022), in which *D. abbreviatus* was identified as a relevant non-regulated EU pest which could potentially enter the EU on *Ligustrum* spp.

2. Data and methodologies

2.1. Data

2.1.1. Information on pest status from NPPOs

In the context of the current mandate, EFSA is preparing pest categorisations for new/emerging pests that are not yet regulated in the EU. When official pest status is not available in the European and Mediterranean Plant Protection Organization (EPPO) Global Database (EPPO, online), EFSA consults the NPPOs of the relevant MSs. To obtain information on the official pest status for *D. abbreviatus*, EFSA has consulted the NPPOs of Portugal, Spain and Sweden. The results of this consultation are presented in Section 3.2.2 and in Appendices C–E.

2.1.2. Literature search

A literature search on *D. abbreviatus* was conducted at the beginning of the categorisation in the ISI Web of Science bibliographic database, using the scientific name of the pest as search term. Papers relevant for the pest categorisation were reviewed, and further references and information were obtained from experts, as well as from citations within the references and grey literature.

2.1.3. Database search

Pest information, on host(s) and distribution, was retrieved from the EPPO Global Database (EPPO, online), the CABI databases and scientific literature databases as referred above in Section 2.1.1.

Data about the import of commodity types that could potentially provide a pathway for the pest to enter the EU and about the area of hosts grown in the EU were obtained from EUROSTAT (Statistical Office of the European Communities).

The Europhyt and TRACES databases were consulted for pest-specific notifications on interceptions and outbreaks. Europhyt is a web-based network run by the Directorate General for Health and Food Safety (DG SANTÉ) of the European Commission as a subproject of PHYSAN (Phyto-Sanitary Controls) specifically concerned with plant health information. TRACES is the European Commission's multilingual online platform for sanitary and phytosanitary certification required for the importation of animals, animal products, food and feed of non-animal origin and plants into the European Union, and the intra-EU trade and EU exports of animals and certain animal products. Up until May 2020, the Europhyt database managed notifications of interceptions of plants or plant products that do not comply with EU legislation, as well as notifications of plant pests detected in the territory of the Member States and the phytosanitary measures taken to eradicate or avoid their spread. The recording of interceptions switched from Europhyt to TRACES in May 2020.

GenBank was searched to determine whether it contained any nucleotide sequences for *D. abbreviatus* which could be used as reference material for molecular diagnosis. GenBank® (www.ncbi.nlm.nih.gov/genbank/) is a comprehensive publicly available database that as of August 2019 (release version 227) contained over 6.25 trillion base pairs from over 1.6 billion nucleotide sequences for 450,000 formally described species (Sayers et al., 2020).

2.2. Methodologies

The Panel performed the pest categorisation for *D. abbreviatus*, following guiding principles and steps presented in the EFSA guidance on quantitative pest risk assessment (EFSA PLH Panel et al., 2018), the EFSA guidance on the use of the weight of evidence approach in scientific assessments (EFSA Scientific Committee et al., 2017) and the International Standards for Phytosanitary Measures No. 11 (FAO, 2013).

The criteria to be considered when categorising a pest as a potential Union QP is given in Regulation (EU) 2016/2031 Article 3 and Annex I, Section 1 of the Regulation. Table 1 presents the Regulation (EU) 2016/2031 pest categorisation criteria on which the Panel bases its conclusions. In judging whether a criterion is met the Panel uses its best professional judgement (EFSA Scientific Committee et al., 2017) by integrating a range of evidence from a variety of sources (as presented above in Section 2.1) to reach an informed conclusion as to whether or not a criterion is satisfied.

The Panel's conclusions are formulated respecting its remit and particularly with regard to the principle of separation between risk assessment and risk management (EFSA founding regulation (EU) No 178/2002); therefore, instead of determining whether the pest is likely to have an unacceptable impact, deemed to be a risk management decision, the Panel will present a summary of the observed impacts in the areas where the pest occurs, and make a judgement about potential likely impacts in the EU. While the Panel may quote impacts reported from areas where the pest occurs in monetary terms, the Panel will seek to express potential EU impacts in terms of yield and quality losses and not in monetary terms, in agreement with the EFSA guidance on quantitative pest risk assessment (EFSA PLH Panel et al., 2018). Article 3 (d) of Regulation (EU) 2016/2031 refers to unacceptable social impact as a criterion for QP status. Assessing social impact is outside the remit of the Panel.

Table 1: Pest categorisation criteria under evaluation, as derived from Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest (article 3)
Identity of the pest (Section 3.1)	Is the identity of the pest clearly defined, or has it been shown to produce consistent symptoms and to be transmissible?
Absence/presence of the pest in the EU territory (Section 3.2)	Is the pest present in the EU territory? If present, is the pest in a limited part of the EU or is it scarce, irregular, isolated or present infrequently? If so, the pest is considered to be not widely distributed.
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	Is the pest able to enter into, become established in, and spread within, the EU territory? If yes, briefly list the pathways for entry and spread.
Potential for consequences in the EU territory (Section 3.5)	Would the pests' introduction have an economic or environmental impact on the EU territory?
Available measures (Section 3.6)	Are there measures available to prevent pest entry, establishment, spread or impacts?
Conclusion of pest categorisation (Section 4)	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential quarantine pest were met and (2) if not, which one(s) were not met.

3. Pest categorisation

3.1. Identity and biology of the pest

3.1.1. Identity and taxonomy

Is the identity of the pest clearly defined, or has it been shown to produce consistent symptoms and/or to be transmissible?

Yes, the identity of the pest is clearly defined. Its scientific name is *D. abbreviatus* L.

D. abbreviatus (L.), 1758, is an insect of the family Curculionidae (Coleoptera). Synonyms include *Curculio abbreviatus* L. (Dmitriev, 2023), *D. spengleri* L. and *Exophthalmus abbreviatus* (L.) (EPPO, online). It has been commonly known as the citrus root weevil, the West Indian sugarcane rootstock borer weevil and the diaprepes root weevil.

The EPPO code¹ (Griessinger and Roy, 2015; EPPO, 2019) for this species is: DPREAB (EPPO, online).

3.1.2. Biology of the pest

Key biological features of *D. abbreviatus* are summarised in Table 2.

Table 2: Important features of the life history strategy of *Diaprepes abbreviatus* (mostly based on Weissling et al., 2012 with additional citations)

Life stage	Phenology and relation to host	Other relevant information
Egg	Eggs are laid in clusters of 30 to more than 250 and enclosed within leaves folded and glued together. One female can lay up to 5,000 eggs during her lifetime. Hatching occurs within 1 week.	The lower developmental threshold for eggs was estimated to be 12°C (Lapointe, 2001). Eggs are highly susceptible to cold, with 95% mortality (LT ₉₅) occurring in 4.2 days at 12°C. Egg mortality was complete after 24 h at 0°C (Lapointe et al., 2007).
Larva	Newly hatched larvae drop off the leaves onto the ground and enter the soil, where they search for and feed on roots. After feeding for several months, the mature larvae pupate in the soil.	The lower threshold for neonate larval development was estimated to be 15°C (Lapointe, 2000a).
Pupa	Pupation takes place in the soil.	Pupal mortality was 100% after 24 h and all longer durations at 0 and 3°C and after 6.5 and 12.5 days at 6 and 9°C, respectively (Lapointe et al., 2007).
Adult	Adults emerge from the soil, seek a host where they gather and feed on the leaves before mating. The complete life cycle varies in time depending on nutritional and environmental factors. Adults can emerge year-round in the Caribbean. However, in Central Florida, emergence peaks from mid-spring to mid-autumn with two peaks, which suggest that this species is bivoltine in that area. In California, adults show one single peak emergence during the warmer months from July to October. Therefore, this weevil is considered univoltine in California (Bates et al., 2015).	Adults do not fly far from the emergence site (estimated to be less than 300 m). Long-distance dispersal is through the movement of infested soil and containerised plants containing potentially all life stages of the weevil. In addition, soil residues on vehicles may be infested with larvae or pupae. A lower threshold for oviposition was estimated as 14.9°C. Adult weevils exposed to 12°C for 2 weeks survived and resumed oviposition when the temperature was returned to 30°C. However, the eggs produced during the post-12°C treatment period at 30°C were nonviable (Lapointe et al., 2007). Females may lay eggs on leaves of artificial plants, as observed in California (J.E. Peña, University of Florida-TREC, personal communication).

3.1.3. Host range/species affected

D. abbreviatus is associated with a wide range of plants, including around 270 species in 157 genera across 59 plant families (Simpson et al., 1996; Spanish NPPO, Appendix C) (see Appendix A). Simpson et al. (1996) compiled all available information about the plants associated with *D. abbreviatus*. In addition, these authors performed no choice feeding laboratory assays with adults. They proved that *D. abbreviatus* adults could feed on 60 out of 62 plants in the family Rutaceae tested in the genera *Aegle*, *Aeglopsis*, *Afraegle*, *Amyris*, *Atalantia*, *Casimiroa*, *Citropsis*, *Citrus*, *Clausena*, *Eremocitrus*, *Fortunella*, *Glycosmis*, *Limonia*, *Microcitrus*, *Murraya*, *Naringi*, *Pamburus*, *Severinia*, *Swinglea*, *Triphasia* and *Zanthoxylum*. Only two exceptions were found: *Citrus ichangensis* and *Eremocitrus glauca*. The 430 specimen identification records collected by Simpson et al. (1996) and those provided by the Spanish NPPO (Appendix C) can be grouped within the four categories below, based on the life stages observed, assuming that the observation of feeding larvae in the roots implies

¹ An EPPO code, formerly known as a Bayer code, is a unique identifier linked to the name of a plant or plant pest important in agriculture and plant protection. Codes are based on genus and species names. However, if a scientific name is changed the EPPO code remains the same. This provides a harmonised system to facilitate the management of plant and pest names in computerised databases, as well as data exchange between IT systems (Griessinger and Roy, 2015; EPPO, 2019).

previous oviposition on the foliage of that plant (see Section 3.1.2 Biology of the pest), even if no egg masses or adults were found when observations were made. In Appendix A, all hosts are shown in one single table first (Table A.1). Then, separate tables for each of the categories listed below are also shown (Tables A.2–A.5):

- A) **Host plants supporting the whole life cycle** (where all life stages, including feeding adults, have been observed), where EU relevant plant species such as *Morus alba* L., *Citrus aurantifolia* (Christm.) Swingle, *Vitis* sp. or *Zea mays* L. are included (Appendix A, Table A.2).
- B) **Host plants most probably supporting the whole life cycle** (where larvae but not all life stages have been observed), where EU relevant plant species such as *Capsicum annuum* L., *Phaseolus vulgaris* L. or *Solanum melongena* L., as well as the genus *Citrus*, are found (Appendix A, Table A.3).
- C) **Plants that could act as a trap crop** (where egg masses, but no larvae, have been observed), including plant species like *Mangifera indica* L., or *Ficus* sp. (Appendix A, Table A.4).
- D) **Adult feeding plants** (plant species where adults but no immature stages have been observed) This category includes more than 150 plant species (Appendix A, Table A.5)

3.1.4. Intraspecific diversity

Adults may display diversity in forewing colour (intraspecific polymorphism), which typically exhibit black lines on a yellowish to brownish background (Figure 1). These differences, though, do not make any difference in relation to the risk they pose to plants.

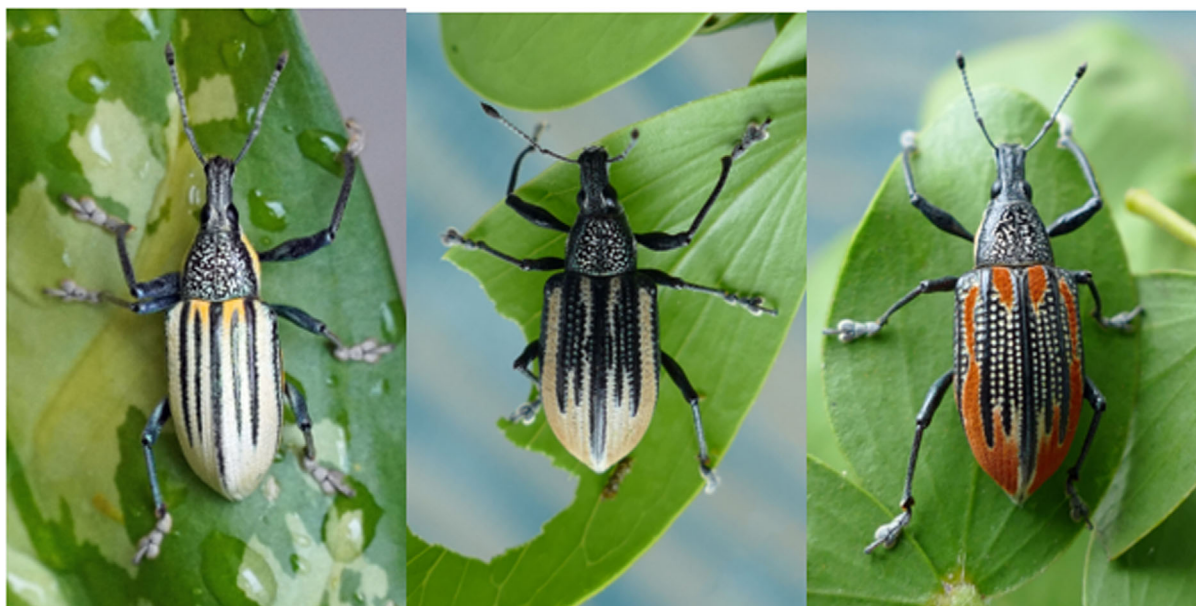


Figure 1: Colour and pattern diversity of the forewings of adult *Diaprepes abbreviatus* (Image courtesy of Chris Malumphy, DEFRA, UK)

3.1.5. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes, visual detection is possible, morphological and molecular identification methods are available.

Detection

According to Weissling et al. (2019), the symptoms caused by adult feeding include notching along the margins of young leaves (Figure 2). However, as this symptom can be caused by other phytophagous insects (i.e. grasshoppers, caterpillars) or other weevils, this should be confirmed by observation of *D. abbreviatus* adults during the day on the canopy. Shaking the plant may aid in detection as adults drop off the plant onto the ground. A light-coloured piece of canvas placed

beneath the plant before shaking is useful. Further confirmation can be gathered from the observation of larval feeding on the roots. Root rot infections by *Phytophthora* spp. usually follow larval damage.

According to UC IPM (2020), two types of traps can be used to collect soil-emerging adults. The first type consists of a base of black vanes that rest on the ground and, as a tree trunk, induces adults to walk up and be caught in an inverted cup. The second type consists of tent-like metal screens placed under the canopies. Both traps should be regularly inspected for captured adults that emerge from soil.



Figure 2: Notching along the leaf margins is a typical symptom of the presence of *Diaprepes abbreviatus*. (Image courtesy of Prof. J.E. Peña, University of Florida-TREC)

Identification

The weevil genus *Diaprepes* Schoenherr is native to the Caribbean region with 15 species from the West Indies and one from Trinidad, Tobago and Venezuela. They belong to the group of weevils known as 'broad-nosed weevils' (University of Florida, 2011). O'Brien and Wibmer (1982) and Wibmer and O'Brien (1986) in their annotated checklists of the weevils of the Americas provide a key for the identification of the adults of *D. abbreviatus*.

Morphological description

According to Thomas et al. (2019), adult weevils are 0.95 to 1.90 cm long. They are black, and overlaid by minute white, red orange and/or yellow scales on the elytra (Figures 1 and 2). These scales are often rubbed off the tops of ridges on the elytra giving the appearance of black stripes on a light-coloured background. Adults emerging from pupae in the soil are armed with a pair of deciduous mandibles which break off as they tunnel through the soil to get above ground. Scars at the site where the deciduous mandibles break off are visible under a microscope. The eggs are usually laid in an irregularly shaped cluster in a single layer. They are oblong-oval in shape (about 1.2×0.4 mm) and smooth, pale yellowish-white and glistening. The larvae are white, legless and C-shaped. Mature larvae reach a length of about 2.5 cm. The head capsule has variable light and dark areas. Pupae occur in the soil and are protected within an earthen cell.

Molecular identification

A barcoding technique based on the PCR amplification and sequencing of the mitochondrial COI gene was developed to use in identification of eggs, larvae and adults of *D. abbreviatus*. This molecular tool provides accurate species identification for management and quarantine decisions about this pest (Ascunce et al., 2009).

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

The current distribution of *D. abbreviatus* is shown in Figure 3 and in Appendix B. This is a neotropical species native to Caribbean from where it was introduced to Florida (USA) in 1964. Southern USA states were subsequently colonised from east to west (Mississippi, Louisiana, Texas and California) (see Appendix B). It has been reported in the west Palearctic and Macaronesia three times during the last 20 years.

It was first found in the Amazonia area of the Tropical biome greenhouse, Eden Project, Cornwall in the UK (Treseder et al., 2011). *D. abbreviatus* was breeding there for approximately 17 years (1997 onwards). In 2004, it was abundant and considered a serious pest. Action (non-statutory) was taken to manage the population and by 2014, it was rarely found, and since then, there have been no further reports (DEFRA, unpublished data). The commodity risk assessment of *Ligustrum delavayanum* topiary grafted on *L. japonicum* plants from the UK performed by EFSA (EFSA PLH Panel, 2022) reports that *D. abbreviatus* was last found there in 2014, and the pest may no longer be present. Although the status in the UK was 'present: transient' by the UK NPPO (EFSA PLH Panel, 2022), there has not been any finding since 2014.

It was also found on the island of Gran Canaria (Canary Islands, Spain) in 2014. According to the Spanish NPPO, 10 additional outbreaks have been detected on that Island since then (Appendix C). Nine of them were eradicated and two of them remain active and are subject to eradication measures. As a consequence, the current status in the Canary Islands, which are considered as a third country according to Regulation 2016/2031, is 'present, restricted distribution'.

Finally, the insect was found in Madeira (Portugal) in 2018 (see Section 3.2.2).

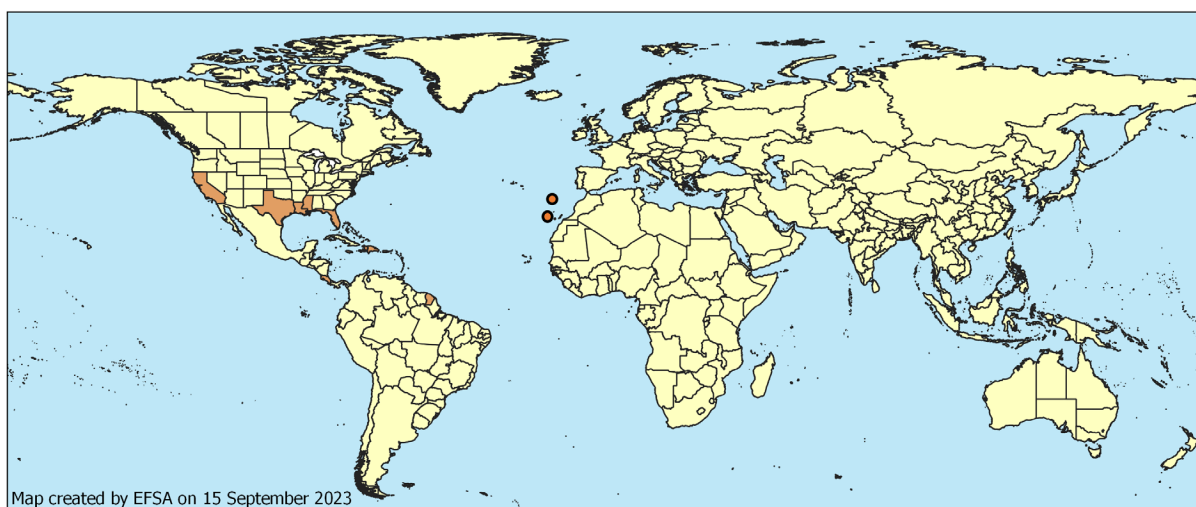


Figure 3: Global distribution of *Diaprepes abbreviatus* (data source: EPPO Global Database, CABI CPC accessed on 15 September 2023, and literature)

3.2.2. Pest distribution in the EU

Is the pest present in the EU territory? If present, is the pest in a limited part of the EU or is it scarce, irregular, isolated or present infrequently? If so, the pest is considered to be not widely distributed.

Yes, the insect was found in 2018 in Madeira (Portugal), where the pest is considered present.

One adult specimen was collected sitting on a wall in the island of Madeira (Portugal), in west Funchal, near Praia Formosa (N32°38'19" W16°56'57", 10 m) in September 2018 (Andrade and Stueben, 2020). According to the Portuguese PPO (see Appendix E), the pest is present in that island, where the insect has been observed feeding on plants in the genera *Hibiscus* and *Schefflera*.

According to the [CABI Compendium](#) and supported by the paper of Seebens et al. (2017), *D. abbreviatus* was considered present in Sweden (introduced in 1993). However, the Swedish PPO, after consultation with the Swedish plant health risk assessors at SLU, Uppsala (see Appendix D), confirmed that the official pest status of *D. abbreviatus* in Sweden is 'Absent, invalid record'.

3.3. Regulatory status

3.3.1. Commission Implementing Regulation 2019/2072

Diaprepes abbreviatus is not listed in Annex II of Commission Implementing Regulation (EU) 2019/2072, an implementing act of Regulation (EU) 2016/2031, or in any emergency plant health legislation.

3.3.2. Hosts or species affected that are prohibited from entering the Union from third countries

Table 3 lists regulated articles prohibited from entering the EU and relevant to the entry of *D. abbreviatus*.

Table 3: List of plants, plant products and other objects that are *Diaprepes abbreviatus* hosts whose introduction into the Union from certain third countries is prohibited (Source: Commission Implementing Regulation (EU) 2019/2072, Annex VI)

List of plants, plant products and other objects whose introduction into the Union from certain third countries is prohibited			
	Description	CN code	Third country, group of third countries or specific area of third country
10.	Plants of <i>Vitis</i> L., other than fruits	0602 10 10	Third countries other than Switzerland
		0602 20 10	
		ex 0604 20 90	
		ex 1404 90 00	
11.	Plants of <i>Citrus</i> L., <i>Fortunella</i> Swingle, <i>Poncirus</i> Raf., and their hybrids, other than fruits and seeds	ex 0602 10 90	All third countries
		ex 0602 20 20	
		ex 0602 20 30	
		ex 0602 20 80	
		ex 0602 90 45	
		ex 0602 90 46	
		ex 0602 90 47	
		ex 0602 90 50	
		ex 0602 90 70	
		ex 0602 90 91	
		ex 0602 90 99	
		ex 0604 20 90	
		ex 1404 90 00	
14.	Plants for planting of the family Poaceae, other than plants of ornamental perennial grasses of the subfamilies Bambusoideae and Panicoideae and of the genera <i>Buchloe</i> , <i>Bouteloua</i> Lag., <i>Calamagrostis</i> , <i>Cortaderia</i> Stapf., <i>Glyceria</i> R. Br., <i>Hakonechloa</i> Mak. ex Honda, <i>Hystrix</i> , <i>Molinia</i> , <i>Phalaris</i> L., <i>Shibataea</i> , <i>Spartina</i> Schreb., <i>Stipa</i> L. and <i>Uniola</i> L., other than seeds	ex 0602 90 50	Third countries other than Albania, Algeria, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canary Islands, Egypt, Faeroe Islands, Georgia, Iceland, Israel, Jordan, Lebanon, Libya, Liechtenstein, Moldova, Monaco, Montenegro, Morocco, North Macedonia, Norway, Russia (only some parts), San Marino, Serbia, Switzerland, Syria, Tunisia, Türkiye, Ukraine and the United Kingdom
		ex 0602 90 91	
		ex 0602 90 99	
18.	Plants for planting of Solanaceae other than seeds and the plants covered by entries 15, 16 or 17 [= <i>Solanum tuberosum</i> L. tubers and plants for planting of stolon- or tuber-forming species of <i>Solanum</i> L. or their hybrids]	ex 0602 10 90	Third countries other than: Albania, Algeria, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canary Islands, Egypt, Faeroe Islands, Georgia, Iceland, Israel, Jordan, Lebanon, Libya, Liechtenstein, Moldova, Monaco, Montenegro, Morocco, North Macedonia, Norway, Russia (only some parts), San Marino, Serbia, Switzerland, Syria, Tunisia, Türkiye, Ukraine and the United Kingdom
		ex 0602 90 30	
		ex 0602 90 45	
		ex 0602 90 46	
		ex 0602 90 48	
		ex 0602 90 50	
		ex 0602 90 70	
		ex 0602 90 91	
		ex 0602 90 99	

3.3.3. Legislation addressing the organisms vectored by *D. abbreviatus* (Commission Implementing Regulation 2019/2072)

The bacterium *Xanthomonas phaseoli* pv. *phaseoli* (EPPO code: XANTPH) (EPPO GD, online) can be disseminated on the bodies of insects such as *D. abbreviatus*, which also creates wounds when feeding, thus producing favourable infection sites for the pathogen (Kaiser and Vakili, 1978). This

bacterium is a regulated non-QP (under the non-preferred scientific name of *Xanthomonas axonopodis* pv. *phaseoli*). This bacterium is mentioned in Annex IV Part F (RNQP concerning vegetable seed) and in Annex V Part E (measures to prevent the presence of the RNQPs on vegetable seed). Because seeds do not provide a plausible entry or spread pathway for this weevil (see Sections 3.4.1 and 3.4.2), this legislation is not relevant for the current categorisation.

3.4. Entry, establishment and spread in the EU

3.4.1. Entry

Is the pest able to enter into the EU territory? If yes, identify and list the pathways.

Yes, the pest is able to enter the EU. Entry pathways include plants for planting (either bare-root or potted with soil/growing medium), cut flowers, cut branches with leaves and soil. Fruit is considered an unlikely entry pathway.

Comment on plants for planting as a pathway.

Plants for planting, especially potted with growing medium or with soil/growing medium attached to their roots, could provide the most relevant entry pathway for *D. abbreviatus*.

Potential pathways for *D. abbreviatus* are presented in Table 4.

Table 4: Potential pathways for *Diaprepes abbreviatus* into the EU

Pathways (e.g. host/intended use/source)	Life stage	Relevant mitigations [e.g. prohibitions (Annex VI), special requirements (Annex VII) or phytosanitary certificates (Annex XI) within Implementing Regulation 2019/2072]
Plants for planting with soil	All life stages	Annex VI prohibits the import of plants for planting of <i>Vitis</i> L., <i>Citrus</i> L., <i>Fortunella</i> Swingle, <i>Poncirus</i> Raf., and the families Poaceae and Solanaceae other than fruit and/or seeds from all third countries where <i>D. abbreviatus</i> is known to occur (Table 3). Annex VII (1.) apply to growing medium attached to plants for planting from third countries other than Switzerland, and Annex VII (6) for certain host plant for planting originating in certain third countries. Annex XI requirements for plants, plant products and other objects subject to phytosanitary certificate for their introduction into the Union territory apply. Annex I of commission implementing regulation (EU)2018/2019 includes <i>Diospyros</i> L. and <i>Ficus carica</i> L., which are considered as 'High Risk Plants' and are hosts of <i>D. abbreviatus</i> . These plants could be imported from countries where <i>D. abbreviatus</i> is known to occur should a derogation be granted.
Bare-root plants for planting	Adults and eggs	Same as above
Cut flowers	Eggs	Annex XI requirements for plants, plant products and other objects subject to phytosanitary certificate for their introduction into the Union territory apply, e.g. cut flowers and flower buds of a kind suitable for bouquets or for ornamental purposes, fresh.
Cut branches with leaves	Eggs	Same as above (Annex XI)
Soil/growing medium	Larvae and pupae	Annex VI (19. and 20.) bans the introduction of soil and growing media as such into the Union from third countries other than Switzerland.
Soil on machinery	Larvae and pupae	Annex VII (2.) Official statement that machinery or vehicles are cleaned and free from soil and plant debris. Annex XI requirements for plants, plant products and other objects subject to phytosanitary certificate for their introduction into the Union territory apply, e.g. for machinery and vehicles which have been operated for agricultural or forestry purposes.

According to EFSA PLH Panel (2022), 'live plants with soil are pathways for all life stages of *D. abbreviatus*'. Indeed, *D. abbreviatus* is frequently intercepted in the USA on both live plants and nursery containers, where adults may be also found as hitchhikers (Grafton-Cardwell et al., 2004; Jetter and Godfrey, 2009). Although cut branches and flowers could carry both eggs and adults of *D. abbreviatus* (EFSA PLH Panel, 2022), adults usually drop from the feeding substrate when disturbed. Therefore, these entry pathways are considered as highly unlikely for adults (hitchhikers) and only considered for eggs in this categorisation. Soil, either as such, on imported machinery, or with plants for planting, could also provide an entry pathway for larvae and pupae (Table 4). Although Grafton-Cardwell et al. (2004) noted that on rare occasions, adults feed on fruit (only for citrus and papaya), as the import of citrus fruit with leaves (where *D. abbreviatus* eggs could be present) from third countries into the EU is prohibited and, same as before, adults usually drop from the feeding substrate when disturbed (during harvest), the fruit entry pathway, which was considered as uncertain by EPPO (DROPSA, 2016), is considered as highly unlikely and not further considered in this categorisation either. Some host plants are prohibited from entering into the EU (*Vitis* L., *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf., and the families Poaceae and Solanaceae other than fruit and/or seeds), while others could be imported but subject to a phytosanitary certificate for their introduction into the Union territory. In some cases, a derogation would be needed (*Diospyros* L. and *Ficus carica* L.) as these are considered 'High Risk Plants'. Finally, soil as such from countries where *D. abbreviatus* is known to occur is prohibited from entering into the EU, while that attached to roots or on machinery is regulated.

Although detailed information on the different types of plants for planting imported into the EU27 from countries where *D. abbreviatus* is known to occur is not available, according to Eurostat imports of HS 06 (live trees and other plants; bulbs, roots and the like, cut flowers and ornamental foliage) from the USA reached 11,000 to 19,000 tons per year during 2018–2022. Much smaller amounts (< 1 ton per year) were imported from other Caribbean countries.

Notifications of interceptions of harmful organisms began to be compiled in Europhyt in May 1994 and in TRACES in May 2020. As of 24 August 2023, there was no records of interception of *D. abbreviatus* in the Europhyt and TRACES databases. However, in 1998 one adult was found by a member of the public associated with banana in the UK (DEFRA).

3.4.2. Establishment

Is the pest able to become established in the EU territory?

Yes, the pest can establish in the EU. Establishment would be possible in small areas located in the southernmost tips of regions of southern EU MS.

Because plants for planting provide the most plausible entry pathway, transfer to a suitable host post-entry and establishment is likely to occur provided that climate is warm enough during winter (areas with a minimum of 15–20 day with a mean daily soil temperature of 12°C in winter).

3.4.2.1. EU distribution of main host plants

Table 5 provides a list of different host plants of *D. abbreviatus* cultivated in the EU.

Table 5: Harvested area of host plants of *Diaprepes abbreviatus* in EU 27, 2017–2021 (1,000 ha). Source EUROSTAT (accessed on 8 June 2023)

Commodity	Code	2017	2018	2019	2020	2021
Sorghum	C1700	135.66	147.85	190.32	217.57	152.64
Green maize	G3000	5,985.90	6,134.91	6,210.36	6,325.30	6,054.31
Eggplants	V3410	20.73	21.24	20.61	20.65	21.85
Small citrus fruits	T2000	149.99	151.05	156.38	156.40	152.37
Pomelos and grapefruits	T4000	3.30	3.49	3.68	3.86	4.05
Peppers (<i>Capsicum</i>)	V3600	59.50	58.92	59.60	57.63	60.67
Grapes	W1000	3,134.93	3,137.17	3,160.68	3,194.61	

3.4.2.2. Climatic conditions affecting establishment

Given the wide host range of *D. abbreviatus* and the broad distribution of their hosts north of latitude 29° N in Florida, the lack of dispersal at higher latitudes there made Lapointe et al. (2007) suggest that climate plays a dominant role in determining the geographic range of *D. abbreviatus*. Based on the critical lower thresholds for neonate larval development and eggs (15 and 12°C, respectively, see Table 2), these authors predicted the geographical areas of California and Texas susceptible to infestation based on climate mapping of the distribution of *D. abbreviatus* in Florida at that time. Probability maps examined the frequency of at least 10, 15, 20, 25 or 30 days per winter when soil temperature was 12°C. The geographic area that experienced between 15 and 20 days per winter with mean daily soil temperature 12°C closely approximated the northern limit of *D. abbreviatus* in Florida. Using the same approach (see Appendix D) and based on the soil temperatures registered during the last 30 years (1993–2022), establishment within the EU would be possible in small areas located in the southernmost tips of regions of southern EU MS (Cyprus, Greece, Malta, Portugal and Spain), including the archipelagos of Madeira and Azores (Portugal) or the islands of Crete and Rhodes (Greece) (Figure 4). Temporary establishment in greenhouses in other territories of the EU would also be possible, as observed in the UK (see Section 3.2.1).

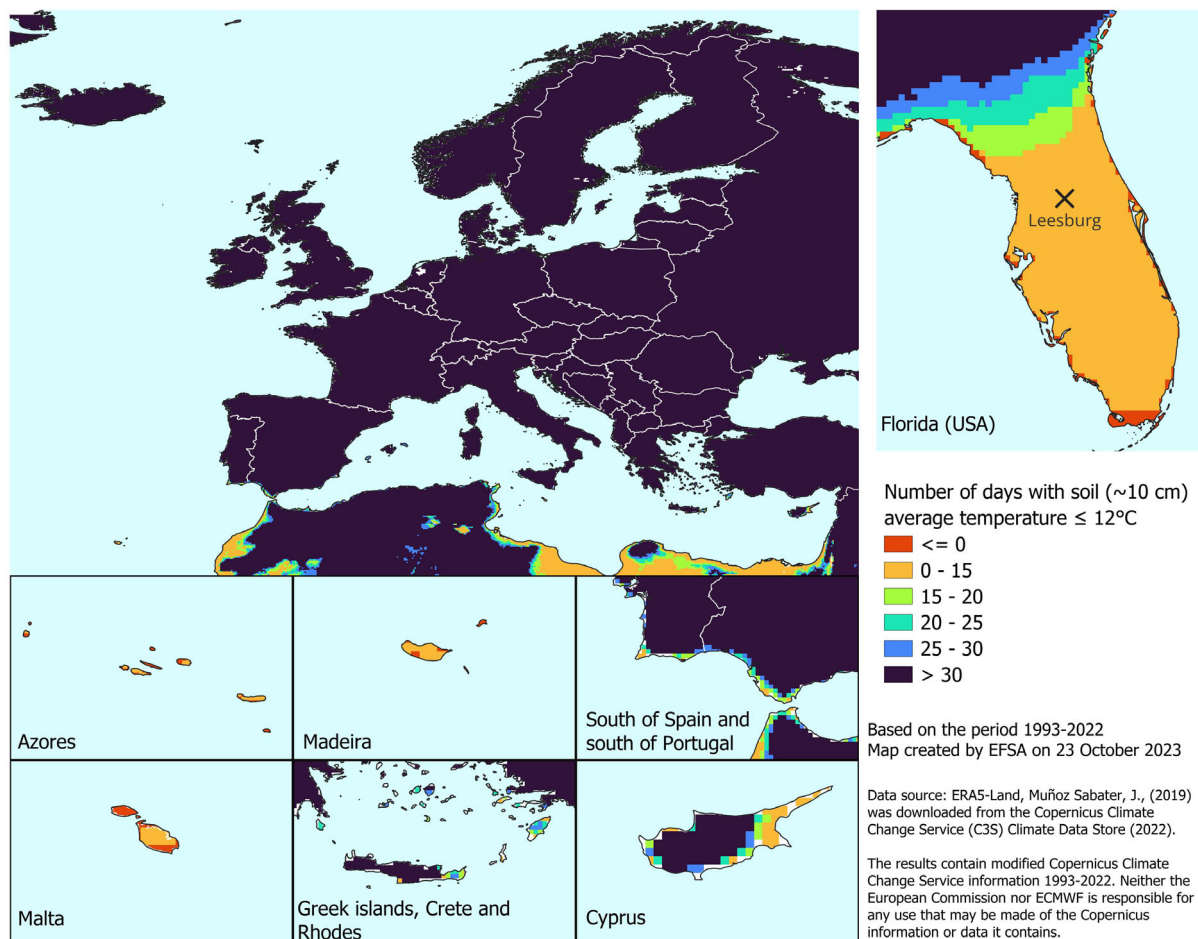


Figure 4: Number of days with mean soil temperature $\leq 12^{\circ}\text{C}$ along the year (average of the period 1993–2022). Boxes at the bottom focus on areas in EU where the number of days is less than 20. According to Lapointe et al., (2007), only areas with less than 20 days at soil temperatures below 12°C per year would allow establishment of *D. abbreviatus* (see Appendix F for details).

3.4.3. Spread

Describe how the pest would be able to spread within the EU territory following establishment?

Adults usually do not fly more than 300 m from the emergence site. Human-assisted movement of plants for planting (especially if containerised with soil) and soil provide the most relevant long-distance mechanism of spread.

Comment on plants for planting as a mechanism of spread.

Plants for planting (especially if containerised with soil) provide the most relevant long-distance mechanism of spread.

The weevils usually do not fly far from the emergence site (estimated to be less than 300 m) (Wiessling et al., 2012). Long-distance dispersal relies on the movement of infested soil and containerised plants containing potentially all life stages of the weevil. In addition, soil residues on vehicles may be contaminated with larvae.

3.5. Impacts

Would the pests' introduction have an economic or environmental impact on the EU territory?

Yes, the introduction of *D. abbreviatus* into the EU would most likely result in an economic and environmental impact on those EU territories where establishment is possible.

According to DROPSA (EPPO GD), 'larval feeding on roots causes stunting and death of plants, and consequently yield reduction; adult damage to leaves is minor (CABI CPC; McCoy and Duncan, 2015). The pest also favours entry of pathogens into the roots, especially *Phytophthora* (Serrano et al., 2010). *D. abbreviatus* is considered to cause estimated annual losses of 75-100 million USD to Citrus production in the Caribbean and Florida (McCoy and Duncan, 2015). In the Caribbean, it is one of the most economically important pests; in Florida, it causes damage to citrus, ornamental plants, and some other crops and has infested more than 40,000 ha of Citrus orchards (Wiessling et al., 2012). *D. abbreviatus* has caused serious damage (decline) on Citrus in the French Antilles (Mauleon and Mademba-Sy, 1988). Therefore, an economic and/or environmental impact is expected in areas where establishment is possible.

3.6. Available measures and their limitations

Are there measures available to prevent pest entry, establishment, spread or impacts such that the risk becomes mitigated?

Yes, see Section 3.3.2 on current measures inhibiting entry. Additional measures are also available to inhibit entry and spread.

3.6.1. Identification of potential additional measures

Phytosanitary measures (prohibitions) are currently applied to some host plants for planting (see Section 3.3.2).

Additional potential risk reduction options and supporting measures are shown in Sections 3.6.1.1 and 3.6.1.2.

3.6.1.1. Additional potential risk reduction options

Potential additional control measures are listed in Table 6.

Table 6: Selected control measures (a full list is available in EFSA PLH Panel et al., 2018) for pest entry/establishment/spread/impact in relation to currently unregulated hosts and pathways. Control measures are measures that have a direct effect on pest abundance

Control measure/ Risk reduction option (<u>Blue underline</u> = <u>Zenodo doc</u> , <u>Blue</u> = <u>WIP</u>)	RRO summary	Risk element targeted (entry/establishment/ spread/impact)
Require pest freedom	Source host plants from a pest free area, pest free place of production or pest free production site.	Entry/spread
<u>Growing plants in isolation</u>	Plants could be grown in dedicated structures such as glass or plastic greenhouses with <i>D. abbreviatus</i> -proof screens.	Entry/spread
Managed growing conditions	Plants collected directly from natural habitats, have been grown, held and trained for at least two consecutive years prior to dispatch in officially registered nurseries, which are subject to an officially supervised control regime.	Entry/spread
Biological control and behavioural manipulation	Natural enemies targeting the eggs (Jacas et al., 2010; Diaz Montilla et al., 2013) and the larvae/pupae in the soil (McCoy et al., 2000) have been described and used in the field in the USA.	Impact
Chemical treatments on crops including reproductive material	Insecticides targeting adults and/or larvae of <i>D. abbreviatus</i> have been tested and used in the USA (Bender et al., 2014). Particle film deters oviposition by <i>D. abbreviatus</i> (Lapointe, 2000b).	Impact
<u>Physical treatments on consignments or during processing</u>	A generic irradiation dose of 150 Gy would prevent development beyond the hatching of eggs in the F1 generation of Curculionidae (Hallman, 2016)	Entry/spread
<u>Cleaning and disinfection of facilities, tools and machinery</u>	The physical and chemical cleaning and disinfection of facilities, tools, machinery, transport means, facilities and other accessories (e.g. boxes, pots, pallets, palox, supports, hand tools).	Entry/spread
<u>Heat and cold treatments</u>	Based on the critical lower thresholds for neonate larvae and egg development (15 and 12°C, respectively, see Table 2), a thermal treatment of consignments at a temperature low enough to kill these stages but harmless to the commodity could be developed (Lapointe et al., 2007)	Entry/spread

3.6.1.2. Additional supporting measures

Potential additional supporting measures are listed in Table 7.

Table 7: Selected supporting measures (a full list is available in EFSA PLH Panel et al., 2018) in relation to currently unregulated hosts and pathways. Supporting measures are organisational measures or procedures supporting the choice of appropriate risk reduction options that do not directly affect pest abundance

Supporting measure (Blue underline = Zenodo doc, Blue = WIP)	Summary	Risk element targeted (entry/establishment/ spread/impact)
Inspection and trapping	Inspection is defined as the official visual examination of plants, plant products or other regulated articles to determine if pests are present or to determine compliance with phytosanitary regulations (ISPM 5). The effectiveness of sampling and subsequent inspection to detect pests may be enhanced by including trapping and luring techniques.	Establishment/spread
Laboratory testing	Examination, other than visual, to determine if pests are present using official diagnostic protocols. Diagnostic protocols describe the minimum requirements for reliable diagnosis of regulated pests.	Establishment/spread
Sampling	According to ISPM 31, it is usually not feasible to inspect entire consignments, so phytosanitary inspection is performed mainly on samples obtained from a consignment. It is noted that the sampling concepts presented in this standard may also apply to other phytosanitary procedures, notably selection of units for testing. For inspection, testing and/or surveillance purposes the sample may be taken according to a statistically based or a non-statistical sampling methodology.	Establishment/spread
Phytosanitary certificate and plant passport	An official paper document or its official electronic equivalent, consistent with the model certificates of the IPPC, attesting that a consignment meets phytosanitary import requirements (ISPM 5) a) export certificate (import) b) plant passport (EU internal trade)	Entry/establishment/ spread
Certification of reproductive material (voluntary/official)	Plants come from within an approved propagation scheme and are certified pest free (level of infestation) following testing; Used to mitigate against pests that are included in a certification scheme.	Establishment/spread
Delimitation of Buffer zones	ISPM 5 defines a buffer zone as 'an area surrounding or adjacent to an area officially delimited for phytosanitary purposes in order to minimise the probability of spread of the target pest into or out of the delimited area, and subject to phytosanitary or other control measures, if appropriate' (ISPM 5). The objectives for delimiting a buffer zone can be to prevent spread from the outbreak area and to maintain a pest free production place (PFPP), site (PFPS) or area (PFA).	Spread
Surveillance	Surveillance to guarantee that plants and produce originate from a Pest Free Area could be an option.	Entry/spread

3.6.1.3. Biological or technical factors limiting the effectiveness of measures

- Egg masses may be difficult to detect.
- Newly hatched larvae may be difficult to detect in the soil.

3.7. Uncertainty

No key uncertainties have been identified in the assessment.

4. Conclusions

D. abbreviatus satisfies all the criteria that are within the remit of EFSA to assess for it to be regarded as a potential Union QP (Table 8).

Table 8: The Panel's conclusions on the pest categorisation criteria defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	The identity of the pest is clearly defined. Its scientific name is <i>Diaprepes abbreviatus</i> L.	None
Absence/presence of the pest in the EU (Section 3.2)	The pest is known to occur in the island of Madeira (Portugal) and is considered not widely distributed in the EU.	None
Pest potential for entry, establishment and spread in the EU (Section 3.4)	<i>D. abbreviatus</i> is able to enter, establish and spread within the EU territory. Main entry and spread pathways are plants for planting, cut flowers, cut branches with leaves and soil.	None
Potential for consequences in the EU (Section 3.5)	The introduction of <i>D. abbreviatus</i> into the EU would most likely result in an economic and environmental impact on those EU territories where establishment is possible.	None
Available measures (Section 3.6)	There are measures to prevent pest entry (i.e. pest free areas), establishment, spread and impact.	None
Conclusion (Section 4)	<i>D. abbreviatus</i> satisfies all of the criteria that are within the remit of EFSA to assess for it to be regarded as a potential Union quarantine pest.	None
Aspects of assessment to focus on/scenarios to address in future if appropriate	–	

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Abbreviations

EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
MS	Member State
PLH	EFSA Panel on Plant Health

PZ	Protected Zone
QP	quarantine pest
TFEU	Treaty on the Functioning of the European Union
ToR	Terms of Reference

Glossary

Containment (of a pest)	Application of phytosanitary measures in and around an infested area to prevent spread of a pest (FAO, 2021)
Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 2021)
Entry (of a pest)	Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled (FAO, 2021)
Eradication (of a pest)	Application of phytosanitary measures to eliminate a pest from an area (FAO, 2021)
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2021)
Greenhouse	A walk-in, static, closed place of crop production with a usually translucent outer shell, which allows controlled exchange of material and energy with the surroundings and prevents release of plant protection products (PPPs) into the environment.
Hitchhiker	An organism sheltering or transported accidentally via inanimate pathways including with machinery, shipping containers and vehicles; such organisms are also known as contaminating pests or stowaways (Toy and Newfield, 2010).
Impact (of a pest)	The impact of the pest on the crop output and quality and on the environment in the occupied spatial units
Introduction (of a pest)	The entry of a pest resulting in its establishment (FAO, 2021)
Pathway	Any means that allows the entry or spread of a pest (FAO, 2021)
Phytosanitary measures	Any legislation, regulation or official procedure having the purpose to prevent the introduction or spread of quarantine pests, or to limit the economic impact of regulated non-quarantine pests (FAO, 2021)
Quarantine pest	A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled (FAO, 2021)
Risk reduction option (RRO)	A measure acting on pest introduction and/or pest spread and/or the magnitude of the biological impact of the pest should the pest be present. A RRO may become a phytosanitary measure, action or procedure according to the decision of the risk manager
Spread (of a pest)	Expansion of the geographical distribution of a pest within an area (FAO, 2021)

Appendix A – *Diaprepes abbreviatus* host plants/species affected

Table A.1: All hosts as indicated by Simpson et al. (1996) and the Spanish NPPO

Family/host name	Common name	Observations			
		AC	AF	L	E
ACERACEAE					
Acer rubrum	Red maple				
ANACARDIACEAE					
Mangifera indica	Mango				
Rhus copallina	Winged sumac				
Schinus terebenthifolius	Brazilian pepper tree				
Spondias mombin	Yellow mombin				
Spondias purpurea	Hog plum				
APIACEAE (UMBELLIFERAE)					
Apium graveolens	Celery				
AQUIFOLIACEAE					
Ilex cassine	Dahoon holly				
Ilex cornuta	Chinese holly				
Ilex glabra	Gallberry				
Ilex x attenuata	Hybrid holly				
Ilex sp.	Holly				
Ilex? syderoxyloides	Gongoli				
Ilex vomitoria	Yaupon holly				
ARALIACEAE					
Schefflera actinophylla	Schefflera				
Schefflera elegantissima	False aralia				
Schefflera arboricola	Dwarf schefflera				
ARECACEAE (PALMAE)					
Chrysalidocarpus lutescens	Areca palm, butterfly palm				
Phoenix dactylifera	Date palm				
Phoenix roebelinii	Pigmy date palm				
Roystonea regia	Royal palm				
Veitchia merrillii	Adonidia palm, Christmas palm				
ASCLEPIACEAE					
Hoya carnosa	Wax plant				
ASPARAGACEAE					
Dracaena compacta	Dracaena				
Dracaena deremensis	Janet Crig dracaena				
Dracaena drago	Dragon tree				
Dracaena cincta	Dracaena rainbow				
Dracaena fragrans	Corn plant				
Dracaena sanderiana	Ribbon plant, Belgian evergreen				
ASTERACEAE (COMPOSITAE)					
Ambrosia artemisifolia	Ragweed				
Baccharis halimifolia	Groundsel bush, salt bush				
BIGNONIACEAE					
Markhamia lutea (*)	Nile tulip, siala tree				
Tabebuia aurea	Silver trumpet tree				

Family/host name	Common name	Observations			
		AC	AF	L	E
BOMBACACEAE					
Ceiba pentandra	Ceiba, kapok				
BORAGINACEAE					
Cordia alliodora	Capá prieto, laurel negro				
Cordia lineata	None				
Cordia sebestena	Ceiger tree				
BRASSICACEAE (CRUCIFERAE)					
Brassica sp.	Mustard				
BURSERACEAE					
Bursera simaruba	Gumbo limbo				
CHRYSOBALANACEAE					
Chrysobalanus icaco	Cocoplum, icaco				
COMBRETACEAE					
Bucida buceras	Black olive, oxhorn bucida				
Conocarpus erectus	Buttonwood, green buttonwood				
Terminalia catappa	Tropical almond				
CONVOLVULACEAE					
Argyreia nervosa	Cephalic vine				
Ipomoea batatas	Sweet potato				
CORYNOCARPACEAE					
Corynocarpus variegata (*)	Karaka, New Zealand laurel				
CUPRESACEAE					
Cupressus sempervirens	Italian cypress				
Juniperus conferta	Shore juniper				
Juniperus x media	Hetz juniper				
Juniperus virginiana	Red cedar				
Platycladus orientalis	Oriental arbovitae				
CYPERACEAE					
Cyperus sp.	Nut grass				
DIOSCOREACEAE					
Dioscorea batatas	Yam				
Dioscorea x cayenensis	Yellow yam				
EBENACEAE					
Diospyros digyna	Black sapote				
Diospyros sp.	Wild persimmon				
Diospyros virginiana	Wild or common persimmon				
EUPHORBIACEAE					
Bischofia javanica	Bishop's bush				
Codiaedum variegatum (*)	Croton				
Jatropha curcas	Physic nut				
Manihot esculenta	Cassava, yuca, manioc, tapioca				
Ricinus communis	Castor bean				
FABACEAE (LEGUMINOSAE)					
Acacia sp.	Acacia				
Albizia lebbek	Woman's tongue				
Andira inermis	Coffee shade				

Family/host name	Common name	Observations			
		AC	AF	L	E
<i>Arachis hypogaea</i>	Ground nut, peanut				
<i>Bauhinia</i> sp.	Orchid tree				
<i>Bauhinia purpurea</i>	Orchid tree				
<i>Bauhinia variegata</i>	Orchid tree				
<i>Caesalpinia mexicana</i>	Caesalpinia				
<i>Cajanus cajan</i>	Pigeon pea, gondul				
<i>Canavalia gladiata</i>	Sword bean, jack bean				
<i>Cassia</i> sp.					
<i>Centrosema pubescens</i>	Butterfly-pea				
<i>Crotalaria</i> sp.	rattlebox				
<i>Delonix regia</i>	Royal poinciana				
<i>Desmodium tortuosum</i>	Beggarweed				
<i>Erythrina berteroana</i>	Bucare				
<i>Erythrina falkersii</i>	Gallito				
<i>Erythrina poeppigiana</i>	Bucare				
<i>Gliricidia septum</i>	Pea tree				
<i>Haematoxylum campechianum</i>	Bloodwood tree				
<i>Indigofera hirsuta</i>	Hairy indigo				
<i>Inga laurina</i>	Guaná, palal, paternillo				
<i>Inga spuria</i>	Guiaba, cuajinicuil				
<i>Lablab purpureus</i>	Bonavist bean, hyacinth bean				
<i>Lonchocarpus domingensis</i>	Genogeno, lancepod				
<i>Lonchocarpus latifolius</i>	Hediondo, lancepod				
<i>Mimosa ceratonia</i>	Zarza				
<i>Macuna deeriingiana</i>	Velvet bean, Bengal bean				
<i>Phaseolus lunarus</i>	Lima bean				
<i>Phaseolus vulgaris</i>	String bean, kidney bean				
<i>Phaseolus</i> sp.	Bean				
<i>Pithcellobium unguis-cati</i>	Bread and cheese, catclaw				
<i>Pithcellobium</i> sp.					
<i>Pongamia pinnata</i>	Pongam				
<i>Pueraria montana</i>	Kudzu vine				
<i>Schrankia leptocarpa</i>	Zarzilla				
<i>Senna obtusifolia</i>	Sicklepod, coffeeweed				
<i>Senna surattensis</i>	Senna				
<i>Tamarindus indica</i>	Tamarind, Indian date				
<i>Tephrosia candida</i>					
<i>Tipuana tipu</i> (*)					
<i>Vigna adenantha</i>	Wild bean				
FAGACEAE					
<i>Quercus laurifolia</i>	Swamp laurel oak				
<i>Quercus virginiana</i>	Live oak				
GUTTIFERAE					
<i>Calophyllum</i> sp.	Calophyllum				
ILLICACEAE					
<i>Illicium anisatum</i>	Anise				
JUGLANDACEAE					
<i>Carya glabra</i>					

Family/host name	Common name	Observations			
		AC	AF	L	E
<i>Carya illinoensis</i>	Pecan				
LAURACEAE					
<i>Octoea portoricensis</i>					
<i>Persea americana</i>	Avocado				
LILIACEAE					
<i>Aloe vera</i>	Aloe				
<i>Hemerocallis</i> sp.					
<i>Liriope</i> sp.	Lilyturf				
LYTHRACEAE					
<i>Lagerstroemia indica</i>	Crape-myrtle				
<i>Lagerstroemia speciosa</i>	Queens's crape-myrtle				
MAGNOLIACEAE					
<i>Magnolia virginiana</i>	Sweet bay				
MALPIGHIACEAE					
<i>Byrsonima crassifolia</i>	Maricao				
<i>Byrsonima spicata</i>	Maricao				
MALVACEAE					
<i>Abelmoschus esculentus</i>	Okra				
<i>Brachychiton</i> sp. (*)	Bottletree				
<i>Gossypium</i> spp.	Cotton				
<i>Hibiscus rosa-sinensis</i>	Hibiscus				
<i>Lagunaria patersonia</i> (*)	Pyramid tree				
<i>Montezuma speciosissima</i>	Mag				
<i>Urena lobata</i>	Caesar weed, Congo jute				
MARANTACEAE					
<i>Maranta leuconeura</i>	Prayer plant				
MELIACEAE					
<i>Azadirachta indica</i>	Neem tree				
<i>Cedrela odorata</i>	Cigar-box cedar				
<i>Guarea trichilioides</i>	Guaraguao				
<i>Melia azedarach</i>	Chinaberry tree				
<i>Swietenia macrophylla</i>	Honduras mahogany				
<i>Swietenia mahagony</i>	Mahogany				
MORACEAE					
<i>Ficus benjamina</i>	Weeping fig				
<i>Ficus citrifolia</i>	Short-leaved fig				
<i>Ficus retusa</i>	Cuban laurel, Indian laurel fig				
<i>Ficus stahlia</i>	Jagüey				
<i>Ficus</i> sp.	Wild fig				
<i>Morus alba</i> (*)	White mulberry				
MUSACEAE					
<i>Musa</i> sp.	Banana				
MYRICACEAE					
<i>Myrica cerifera</i>	Wax-myrtle				
MYRSINACEAE					
<i>Ardisia crenata</i>	Coralberry, coral ardisia				
<i>Ardisia crispa</i>	Christmas berry				

Family/host name	Common name	Observations			
		AC	AF	L	E
MYRTACEAE					
Callistemon citrinus	Lemon bottlebush				
Eugenia uniflora	Surinam cherry				
Feijoa sellowiana	Pineapple guava				
Myrcianthes simpsonii	Simpson’s stopper				
Pimenta racemosa	Bay-rum tree				
Psidium littorale	Cattley guava				
Psidium guajaba	Common guava				
Psidium sp.	Guava				
Syzygium aqueum (*)	Watery rose, water apple				
Syzygium jambos	Rose apple				
NYCTAGINACEAE					
Guapira fragrans	Corcho prieto				
OLACACEAE					
Ximenia americana	Hog plum				
PASSIFLORACEAE					
Passiflora incarnata	Maypop				
Passiflora sp.	Passiofruit				
PIPERACEAE					
Piper sp.	Pepper (black)				
PITTOSPORACEAE					
Pittosporum tobira	Chinese pittosporum				
POACEAE (GRAMINAE)					
Bothriochloa pertusa	Pitted. bluestem				
Panicum maximum	Guineagrass				
Saccharum officinarum	Sugarcane				
Sorghum bicolor	Sorghum, Guinea corn				
Zea mays	Maize, corn, Indian corn				
POLYGONACEAE					
Coccoloba uvifera	Sea grape				
Triplaris sp.	Triplaria				
RHIZOPHORACEAE					
Rhizophora mangle	Mangrove				
ROSACEAE					
Eriobotrya japonica	Loquat				
Prunus caroliniana	Carolina cherry-laurel				
Prunus persivca	Peach				
Prunus sp.	Wild cherry				
Pyrus communis	Pear				
Rosa sp.	Rose				
Rubus argulus	Blackberry				
RUBIACEAE					
Coffea arabica	Coffee				
RUTACEAE					
X Citroncirus ‘Swingle’	Swingle citrumelo				
X Citroncirus ‘webberi’	Carrizo citrange				
Citrus aurantifolia	Lime				

Family/host name	Common name	Observations			
		AC	AF	L	E
<i>Citrus jambhiri</i>	Milam lemon				
<i>Citrus macrophylla</i>	Alemow				
<i>Citrus maxima</i>	Pummelo				
<i>Citrus x Poncirus trifoliata</i>	Pummelo x trifoliolate orange				
<i>Citrus medica</i>	Acid citron				
<i>Citrus reticulata</i>	Mandarin				
<i>Citrus paradisi</i>	Grapefruit				
<i>Citrus reshni</i>	Cleopatra mandarin				
<i>Citrus reticulata</i>	Mandarin, tangerine				
<i>Citrus sinensis</i>	Sweet orange				
<i>Citrus</i> sp.	Citrus				
<i>Citrus x tangelo</i>	Orlando tangelo				
<i>Fortunella</i> sp.	Kumquat				
<i>Murraya paniculata</i>	Orange jasmine				
<i>Poncirus trifoliata</i> 'Flying dragon' x <i>Citrus maxima</i> 'Nakorn'					
<i>Zanthoxylum americanum</i>	Toothache tree				
<i>Zanthoxylum caribaeum</i>	Prickly yellow scorpion tree				
<i>Zanthoxylum clava-herculis</i>	Prickly ash, Hercules' club				
SALICACEAE					
<i>Salix humboldtiana</i>	Huboldt's willow				
SAPINDACEAE					
<i>Cupaniopsis anacardioides</i>	Carrotwood				
<i>Dimocarpus longan</i>	Longan				
<i>Koelreuteria elegans</i>	Golden rain tree				
<i>Melicoccus bijugatus</i>	Spanish lime, genip				
SAPOTACEAE					
<i>Chrysophyllum cainito</i>	Star apple				
<i>Chrysophyllum oliviforme</i>	Satin leaf				
<i>Manilkara roxburghiana</i>	Mimusops				
<i>Manilkara zapota</i>	Sapodilla				
SOLANACEAE					
<i>Acnistus arborescens</i>	Galán arbóreo				
<i>Capsicum annuum</i>	Pepper				
<i>Cestrum diurnum</i>	Day jasmine, day cestrum				
<i>Nicotiana tabacum</i>	Tobacco				
<i>Solanum melongena</i>	Aubergine, eggplant				
<i>Solanum tuberosum</i>	Potato				
STERCULIACEAE					
<i>Guazuma ulmifolia</i>	Bastard cedar, white elm				
<i>Theobroma cacao</i>	Cocoa				
ULMACEAE					
<i>Celtis laevigata</i>					
<i>Ulmus parviflora</i>					
VERBENACEAE					
<i>Clerodendrum indicum</i>					

Family/host name	Common name	Observations			
		AC	AF	L	E
VITACEAE					
Vitis sp. (*)	Grapevine				
ZYGOPHYLLACEAE					
Guaiacum officinale					
Kallstroemia maxima					

AC: adult collection; AF: adult feeding; L: larvae found; E: egg masses found.

*: see also Appendix C.

Tables A.2–A.5 further lists the plants associated with *D. abbreviatus* according to the different life stages observed on them.

Table A.2: Host plants supporting the whole life cycle (where all life stages, including feeding adults, have been observed)

Family/host name	Common name	Observations			
		AC	AF	L	E
<i>Dracaena drago</i> (L.) L.	Dragon tree				
BIGNONIACEAE					
<i>Markhamia lutea</i>	Nile tulip, siala tree				
CONVOLVULACEAE					
<i>Ipomoea batatas</i> (L.) Lam.	Sweet potato				
FABACEAE (LEGUMINOSAE)					
<i>Arachis hypogaea</i> L.	Ground nut, peanut				
<i>Tipuana tipu</i> Kuntze					
MALVACEAE					
<i>Brachychiton</i> sp.	Bottletree				
MORACEAE					
<i>Morus alba</i> L.	White mulberry				
MYRTACEAE					
<i>Eugenia uniflora</i> L.	Surinam cherry				
POACEAE (GRAMINAE)					
<i>Saccharum officinarum</i> L.	Sugarcane				
<i>Sorghum bicolor</i> L.	Sorghum, Guinea corn				
<i>Zea mays</i> L.	Maize, corn, Indian corn				
RUTACEAE					
<i>Citrus aurantifolia</i> (Christm.) Swingle	Lime				
VITACEAE					
<i>Vitis</i> sp.	Grapevine				

AC: adult collection; AF: adult feeding; L: larvae found; E: egg masses found.

Table A.3: Host plants most probably supporting the whole life cycle (where larvae but not all life stages have been observed)

Family/host name	Common name	Observations			
		AC	AF	L	E
ARALIACEAE					
<i>Schefflera actinophylla</i> (End.) Harms	Schefflera				
<i>S. elegantissima</i> (Veitch.) Lowry & Frodin	False aralia				

Family/host name	Common name	Observations			
		AC	AF	L	E
ARECACEAE (PALMAE)					
Veitchia merrillii Becc.	Christmas palm				
ASCLEPIACEAE					
Hoya carnosa (L.f.) R. Br	Wax plant				
ASPARAGACEAE					
Dracaena cincta	Dracaena rainbow				
Dracaena sanderiana Hort.	Ribbon plant				
CORYNOCARPACEAE					
Corynocarpus variegata	Karaka, New Zealand laurel				
CUPRESACEAE					
Juniperus conferta L.	Shore juniper				
Juniperus virginiana L.	Red cedar				
CYPERACEAE					
Cyperus sp.	Nut grass				
DIOSCOREACEAE					
Dioscorea x cayenensis	Yellow yam				
EBENACEAE					
Diospyros virginiana	Wild or common persimmon				
EUPHORBIACEAE					
Manihot esculenta	Cassava, yuca, manioc, tapioca				
FABACEAE (LEGUMINOSAE)					
Crotalaria sp.	rattlebox				
Phaseolus lunarus	Lima bean				
Phaseolus vulgaris	String bean, kidney bean				
Pithcellobium unguis-cati	Bread and cheese, catclaw				
Pithcellobium sp.					
LILIACEAE					
Aloe vera	Aloe				
Liriope sp.	Lilyturf				
MALVACEAE					
Lagunaria patersonia	Pyramid tree				
Urena lobata	Caesar weed, Congo jute				
MARANTACEAE					
Maranta leuconeura	Prayer plant				
MELIACEAE					
Swietenia mahagony	Mahogany				
MYRSINACEAE					
Ardisia crenata	Coralberry, coral ardisia				
MYRTACEAE					
Syzygium aqueum	Watery rose, water apple				
PIPERACEAE					
Piper sp.	Pepper (black)				
POACEAE (GRAMINAE)					
Bothriochloa pertusa	Pitted. bluestem				
RUTACEAE					
X Citroncirus 'Swingle'	Swingle citrumelo				

Family/host name	Common name	Observations			
		AC	AF	L	E
<i>X Citroncirus 'webberi'</i>	Carrizo citrange				
<i>Citrus jambhiri</i>	Milam lemon				
<i>Citrus macrophylla</i>	Alemow				
<i>Citrus x Poncirus trifoliata</i>	Pummelo x trifoliata orange				
<i>Citrus medica</i>	Acid citron				
<i>Citrus paradisi</i>	Grapefruit				
<i>Citrus reshni</i>	Cleopatra mandarin				
<i>Citrus sinensis</i>	Sweet orange				
<i>Citrus</i> sp.	Citrus				
<i>Poncirus trifoliata</i> 'Flying dragon' x <i>Citrus maxima</i> 'Nakorn'					
SOLANACEAE					
<i>Capsicum annuum</i>	Pepper				
<i>Solanum melongena</i>	Aubergine, eggplant				
STERCULIACEAE					
<i>Theobroma cacao</i>	Cocoa				

AC: Adult collection; AF: Adult feeding; L: larvae; E: egg masses.

Table A.4: Plants that could act as a trap crop (where egg masses, but no larvae, have been observed)

Family/host name	Common name	Observations			
		AC	AF	L	E
ANACARDIACEAE					
Mangifera indica	Mango				
Spondias mombin	Yellow mombin				
ASPARAGACEAE					
Dracaena fragrans	Corn plant				
CONVOLVULACEAE					
Argyrea nervosa	Cephalic vine				
MORACEAE					
Ficus benjamina	Weeping fig				
Ficus citrifolia	Short-leaved fig				
Ficus retusa	Cuban laurel, Indian laurel fig				
Ficus stahlia	Jagüey				
Ficus sp.	Wild fig				
POACEAE (GRAMINAE)					
Panicum maximum	Guinea grass				

AC: Adult collection; AF: Adult feeding; L: larvae; E: egg masses.

Table A.5: Adult feeding plants (plant species where adults but no immature stages have been observed)

Family/host name	Common name	Observations			
		AC	AF	L	E
ANACARDIACEAE					
<i>Rhus copallina</i>	Winged sumac				
<i>Spondias purpurea</i>	Hog plum				

Family/host name	Common name	Observations			
		AC	AF	L	E
APIACEAE (UMBELLIFERAE)					
Apium graveolens	Celery				
AQUIFOLIACEAE					
Ilex cassine	Dahoon holly				
Ilex cornuta	Chinese holly				
Ilex glabra	Gallberry				
Ilex x attenuata	Hybrid holly				
Ilex sp.	Holly				
Ilex? syderoxyloides	Gongoli				
Ilex vomitoria	Yaupon holly				
ARALIACEAE					
Schefflera arboricola	Dwarf schefflera				
ARECACEAE (PALMAE)					
Chrysalidocarpus lutescens	Areca palm, butterfly palm				
Phoenix dactylifera	Date palm				
Phoenix roebelinii	Pigmy date palm				
Roystonea regia	Royal palm				
ASPARAGACEAE					
Dracaena deremensis	Janet Crig dracaena				
ASTERACEAE (COMPOSITAE)					
Ambrosia artemisifolia	Ragweed				
Baccharis halimifolia	Groundsel bush, salt bush				
BIGNONIACEAE					
Tabebuia aurea	Silver trumpet tree				
BOMBACACEAE					
Ceiba pentandra	Ceiba, kapok				
BORAGINACEAE					
Cordia alliodora	Capá prieto, laurel negro				
Cordia lineata	None				
Cordia sebestena	Ceiger tree				
BRASSICACEAE (CRUCIFERAE)					
Brassica sp.	Mustard				
BURSERACEAE					
Bursera simaruba	Gumbo limbo				
CHRYSOBALANACEAE					
Chrysobalanus icaco	Cocoplum, icaco				
COMBRETACEAE					
Bucida buceras	Black olive, oxhorn bucida				
Conocarpus erectus	Buttonwood, green buttonwood				
Terminalia catappa	Tropical almond				
CUPRESACEAE					
Cupressus sempervirens	Italian cypress				
Juniperus x media	Hetz juniper				
Platycladus orientalis	Oriental arbovitae				
DIOSCOREACEAE					
Dioscorea batatas	Yam				

Family/host name	Common name	Observations			
		AC	AF	L	E
EBENACEAE					
Diospyros digyna	Black sapote				
Diospyros sp.	Wild persimmon				
EUPHORBIACEAE					
Bischofia javanica	Bishop's bush				
Codiaedum variegatum	Croton				
Jatropha curcas	Physic nut				
Ricinus communis	Castor bean				
FABACEAE (LEGUMINOSAE)					
Acacia sp.	Acacia				
Albizia lebbek	Woman's tongue				
Andira inermis	Coffee shade				
Bauhinia sp.	Orchid tree				
Bauhinia purpurea	Orchid tree				
Bauhinia variegata	Orchid tree				
Caesalpinia mexicana	Caesalpinia				
Cajanus cajan	Pigeon pea, gondul				
Canavalia gladiata	Sword bean, jack bean				
Cassia sp.					
Centrosema pubescens	Butterfly-pea				
Delonix regia	Royal poinciana				
Desmodium tortuosum	Beggarweed				
Erythrina berteroana	Bucare				
Erythrina folkersii	Gallito				
Erythrina poeppigiana	Bucare				
Gliricidia septum	Pea tree				
Haematoxylum campechianum	Bloodwood tree				
Indigofera hirsuta	Hairy indigo				
Inga laurina	Guaná, palal, paternillo				
Inga spuria	Guiaba, cuajinicuil				
Lablab purpureus	Bonavist bean, hyacinth bean				
Lonchocarpus domingensis	Genogeno, lancepod				
Lonchocarpus latifolius	Hediondo, lancepod				
Mimosa ceratonia	Zarza				
Macuna deeriingiana	Velvet bean, Bengal bean				
Phaseolus sp.	Bean				
Pongamia pinnata	Pongam				
Pueraria montana	Kudzu vine				
Schrankia leptocarpa	Zarzilla				
Senna obtusifolia	Sicklepod, coffeeweed				
Senna surattensis	Senna				
Tamarindus indica	Tamarind, Indian date				
Tephrosia candida					
Vigna adenantha	Wild bean				
FAGACEAE					
Quercus laurifolia	Swamp laurel oak				
Quercus virginiana	Live oak				

Family/host name	Common name	Observations			
		AC	AF	L	E
GUTTIFERAE					
Calophyllum sp.	Calophyllum				
ILLICACEAE					
Illicium anisatum	Anise				
JUGLANDACEAE					
Carya glabra					
Carya illinoensis	Pecan				
LAURACEAE					
Octoea portoricensis					
Persea americana	Avocado				
LYTHRACEAE					
Lagerstroemia indica	Crape-myrtle				
Lagerstroemia speciosa	Queens's crape-myrtle				
MAGNOLIACEAE					
Magnolia virginiana	Sweet bay				
MALPIGHIACEAE					
Byrsonima crassifolia	Maricao				
Byrsonima spicata	Maricao				
MALVACEAE					
Abelmoschus esculentus	Okra				
Gossypium spp.	Cotton				
Hibiscus rosa-sinensis	Hibiscus				
Montezuma speciosissima	Mag				
MELIACEAE					
Azadirachta indica	Neem tree				
Cedrela odorata	Cigar-box cedar				
Guarea trichilioides	Guaraguo				
Melia azedarach	Chinaberry tree				
Swietenia macrophylla	Honduras mahogany				
MORACEAE					
Ficus benjamina	Weeping fig				
Ficus retusa	Cuban laurel, Indian laurel fig				
Ficus stahlii	Jagüey				
MUSACEAE					
Musa sp.	Banana				
MYRICACEAE					
Myrica cerifera	Wax-myrtle				
MYRSINACEAE					
Ardisia crispa	Christmas berry				
MYRTACEAE					
Callistemon citrinus	Lemon bottlebush				
Feijoa sellowiana	Pineapple guava				
Myrcianthes simpsonii	Simpson's stopper				
Pimenta racemosa	Bay-rum tree				
Psidium littorale	Cattley guava				
Psidium quajaba	Common quava				

Family/host name	Common name	Observations			
		AC	AF	L	E
<i>Psidium</i> sp.	Guava				
<i>Syzygium jambos</i>	Rose apple				
NYCTAGINACEAE					
<i>Guapira fragrans</i>	Corcho prieto				
OLACACEAE					
<i>Ximenia americana</i>	Hog plum				
PASSIFLORACEAE					
<i>Passiflora incarnata</i>	Maypop				
<i>Passiflora</i> sp.	Passion fruit				
PITTOSPORACEAE					
<i>Pittosporum tobira</i>	Chinese pittosporum				
POLYGONACEAE					
<i>Coccoloba uvifera</i>	Sea grape				
<i>Triplaris</i> sp.	Triplaria				
RHIZOPHORACEAE					
<i>Rhizophora mangle</i>	Mangrove				
ROSACEAE					
<i>Eriobotrya japonica</i>	Loquat				
<i>Prunus caroliniana</i>	Carolina cherry-laurel				
<i>Prunus persivca</i>	Peach				
<i>Prunus</i> sp.	Wild cherry				
<i>Pyrus communis</i>	Pear				
<i>Rosa</i> sp.	Rose				
<i>Rubus argulus</i>	Blackberry				
RUBIACEAE					
<i>Coffea arabica</i>	Coffee				
RUTACEAE					
<i>Citrus maxima</i>	Pummelo				
<i>Citrus reticulata</i>	Mandarin				
<i>Citrus reticulata</i>	Mandarin, tangerine				
<i>Citrus x tangelo</i>	Orlando tangelo				
<i>Fortunella</i> sp.	Kumquat				
<i>Murraya paniculata</i>	Orange jasmine				
<i>Zanthoxylum americanum</i>	Toothache tree				
<i>Zanthoxylum caribaeum</i>	Prickly yellow scorpion tree				
<i>Zanthoxylum clava-herculis</i>	Prickly ash, Hercules' club				
SALICACEAE					
<i>Salix humboldtiana</i>	Huboldt's willow				
SAPINDACEAE					
<i>Cupaniopsis anacardioides</i>	Carrotwood				
<i>Dimocarpus longan</i>	Longan				
<i>Koelreuteria elegans</i>	Golden rain tree				
<i>Melicoccus bijugatus</i>	Spanish lime, genip				
SAPOTACEAE					
<i>Chrysophyllum cainito</i>	Star apple				
<i>Chrysophyllum oliviforme</i>	Satin leaf				
<i>Manilkara roxburghiana</i>	Mimusops				

Family/host name	Common name	Observations			
		AC	AF	L	E
<i>Manilkara zapota</i>	Sapodilla				
SOLANACEAE					
<i>Acnistus arborescens</i>	Galán arbóreo				
<i>Cestrum diurnum</i>	Day jasmine, day cestrum				
<i>Nicotiana tabacum</i>	Tobacco				
<i>Solanum tuberosum</i>	Potato				
STERCULIACEAE					
<i>Guazuma ulmifolia</i>	Bastard cedar, white elm				
<i>Theobroma cacao</i>	Cocoa				
ULMACEAE					
<i>Celtis laevigata</i>					
<i>Ulmus parviflora</i>					
VERBENACEAE					
<i>Clerodendrum indicum</i>					
ZYGOPHYLLACEAE					
<i>Guaiacum officinale</i>					
<i>Kallstroemia maxima</i>					

AC: Adult collection; AF: Adult feeding; L: larvae; E: egg masses.

Appendix B – Distribution of *Diaprepes abbreviatus*

Distribution records based on the EPPO Global Database (EPPO, online), CABI CPC (CABI, online) and literature.

Region	Country	Sub-national (e.g. State)	Status	
North America	USA		Present, restricted distribution	EPPO (online); Seebens et al. (2017)
		California	Present, restricted distribution	EPPO (online); Bates et al. (2015)
		Florida	Present, no details	EPPO (online); Cherry et al. (2017)
		Louisiana	Present, few occurrences	EPPO (online); State of Louisiana. Department of Agriculture and Forestry. 2009 (online)
		Mississippi	Present	CABI (1980)
		Texas	Present, restricted distribution	EPPO (online); Ascunce et al. (2008)
		Virgin Islands (British)	Present, no details	EPPO (online); Peck et al. (2014)
		Virgin Islands (US)	Present, no details	EPPO (online); Peck et al. (2014)
Central America	Costa Rica		Present, no details	CABI (1980)
South America	French Guiana		Present	CABI (1980)
Caribbean	Antigua and Barbuda		Present, no details	EPPO (online)
	Barbados		Present, no details	EPPO (online); Metcalfe (1959)
	Dominica		Present, no details	EPPO (online); Blackwelder (1947)
	Dominican Republic		Present, no details	EPPO (online); Peck et al. (2014)
	Grenada		Present, no details	EPPO (online)
	Guadeloupe		Present, no details	EPPO (online); Etienne and Delvare (1991)
	Haiti		Present, no details	EPPO (online); Mumford (1964)
	Jamaica		Present, no details	EPPO (online); CABI (1980)
	Martinique		Present, no details	EPPO (online); Dupin (2017)
	Montserrat		Present, no details	EPPO (online); CABI (1980)
	Puerto Rico		Present, no details	EPPO (online); Virkki et al. (1991)
	Saint Lucia		Present, no details	EPPO (online); Ulmer et al. (2006)
	St Kitts-Nevis		Present, no details	EPPO (online); CABI (1980)
	St Vincent and the Grenadines		Present, no details	EPPO (online); Blackwelder (1947)
	Trinidad and Tobago		Present, no details	EPPO (online); Sirjusingh et al. (1992)
EU (27)	Portugal		Present, no details	Portuguese NPPO (Appendix E)

Region	Country	Sub-national (e.g. State)	Status	
Other Europe	Canary Islands (Spain)		Present, restricted distribution	Spanish NPPO (Appendix C)
	UK		Present, transient	UK NPPO in EFSA PLH Panel (2022)

Appendix C – Response of the Spanish NPPO about the status of *Diaprepes abbreviatus*

(JULY 2023)

Diaprepes abbreviatus is present on the Canary Islands (Spain).

A total of 11 outbreaks have been detected in the Island of Gran Canaria since the first detection in 2014 and 9 of them have been eradicated and only 2 of them remaining active Outbreaks N° 2 and N° 11:

Host plants affected:

Outbreak 2: *Tipuana tipu*, *Morus alba*, *Brachychiton* sp., *Coccoloba uvifera*, *Hybiscus* sp, *Citrus* sp; *Lagunaria patersonii*, *Corynocarpus variegata*, *Markhamia lutea lutea*, *Schefflera*, *Codiaeum croton*, *Schinus terebinthifolius* and *Syzygium aqueum*.

Outbreak 11: *Vitis* sp.

Infected area: the total area affected does not exceed 2 ha.

Buffer zone: The security area is around 10 ha. For each location, a demarcated area radius of 300 m has been established.

Current situation: Measures in outbreaks

Outbreak 2: eradication measures are being applied: application of phytosanitary products and in the case of finding any plant specimen with symptoms, it is destroyed.

Outbreak 11: outbreak detected on 23 December 2019, the neighbouring plots were surveyed considering the natural dispersal capacity of the pest and no new finding was detected. A phytosanitary treatment has been carried out to control adults (Karate Zeon) and continuous visits have been made to check the state of the pest. Furthermore, an agreement has been reached with the landowner and the vine crop is being removed, then weed control netting will be placed along the crop lines, after a phytosanitary treatment of the soil. After 2 years, if no new findings are detected the outbreak could be considered as eradicated.

The level of vigilance is being maintained at both points with monthly surveys.

The following eradication measures are carrying out for their eradication in the 2 outbreaks in force on the Island of Gran Canaria.

Eradication measures

- Treatment with phytosanitary products to both the aerial part and the root zone.
- Destruction of the affected plants, both root system and the aerial part, by means of a bio-shredder and a Second: Destruction of the affected plants, both of the root system and the aerial part, by means of a bio-shredder and subsequent burying of the remains with phytosanitary treatment.
- Placement of anti-weed netting on the ground where the destroyed plant species were growing, with the aim of the biological cycle of the insect, preventing the emergence of the adults from the soil and making it impossible for them to emerge from the emergence of adults from the soil and making it impossible for newly hatched larvae to bury themselves.
- Prohibition of the movement of material, host plant material and/or plant material close to the affected plant material which has been removed and susceptible to being a host.
- Monitoring of each registered nursery in Gran Canaria and Tenerife, then in the rest of the islands.
- Monthly surveys to detect the presence of the pest, prioritising the areas close to the outbreaks detected.

The Canary Islands are an EU third country according to Regulation 2016/2031, so they have their own status:

The status of Spain is **Absent, no pest record**. (Canary Islands is not included).

The status of Canary Islands is **Present, restricted distribution**.

(SEPTEMBER 2023)

Host plant table filled with data from the plant health authorities of the Government of the Canary Islands.

	<i>D. abbreviatus</i> stage/s observed			
	Adult collection	Adult feeding	Larvae in roots	Egg masses
<i>Tipuana tipu</i>	Observed	Observed	Observed	Observed
<i>Morus alba</i>	Observed	Observed	Observed	THERE IS NO RECORD OF*
<i>Brachychiton</i> sp.	Observed	Observed	Observed	Observed
<i>Lagunaria patersonii</i>	Observed	Observed	Observed	THERE IS NO RECORD OF*
<i>Corynocarpus variegata</i>	Observed	THERE IS NO RECORD OF*	Observed	THERE IS NO RECORD OF*
<i>Markhamia lutea lutea</i>	Observed	Observed	Observed	Detected
<i>Codiaedum croton</i>	Observed	THERE IS NO RECORD OF*	Observed	THERE IS NO RECORD OF*
<i>Syzygium aqueum</i>	Observed	Observed	Observed	THERE IS NO RECORD OF*
<i>Vitis</i> sp.	Observed	Observed	Observed	Observed

*: Not observed, but an affirmative or negative answer cannot be given because it has not been specifically reviewed.

Appendix D – Response of the Swedish NPPO about the status of *Diaprepes abbreviatus*

(SEPTEMBER 2023)

'In reply to your question below, the official pest of *D. abbreviatus* in Sweden is "Absent, invalid record". To reach this conclusion, the Swedish NPPO consulted the Swedish plant health risk assessors at SLU University, Uppsala, and you can find their assessment in the PDF-document attached to this email'.

CABI will update the pest status for Sweden in their database.

The detailed report on the presence of *D. abbreviatus* in Sweden prepared by SLU was archived with the literature references supporting this document.

Appendix E – Response of the Portuguese NPPO about the status of *Diaprepes abbreviatus*

(SEPTEMBER 2023)

'The only information we have is that the insect feeds on various ornamental plants, notably Hibiscus and Schefflera. Up to now the colleagues from Madeira have no records on other crops affected. Just a few insects have been found in Funchal (Madeira island), and no data about the damages caused by the pest is available'.

Appendix F – Methodological note for the climatic modelling of Europe and Florida in relation to *D. abbreviatus* thermal thresholds

Based on Lapointe et al. (2007), the mean number of days with mean soil temperature $\leq 12^{\circ}\text{C}$ (Figure 4) was based on the temperatures obtained as follows:

- Mean soil temperature was calculated as the mean between daily soil minimum and maximum temperatures ($T_{\min}$ and $T_{\max}$, respectively).
- The original published work was based on interpolated soil temperature measured with a sensor at 10 cm depth. The maps are based on data from the Copernicus ERA5Land dataset which includes soil temperature for different layers. The first two layers are 0–7 cm and 7–28 cm. The soil temperature is considered representative for the middle of each layer.
- To have a comparable depth, the soil temperature used was the mean temperature between the two layers.