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SCIENTIFIC OPINION

Pest categorisation of *Lepidosaphes pistaciae*

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The declarations of interest of all scientific experts active in EFSA's work are available at https://open.efsa.europa.eu/experts

Abstract

Following the commodity risk assessment of *Prunus persica* and *P. dulcis* plants for planting from Türkiye, in which *Lepidosaphes pistaciae* (Hemiptera: Diaspididae), the pistachio oyster scale or yellow pistachio scale, was identified as a pest of possible concern, the EFSA Panel on Plant Health performed a pest categorisation for the territory of the European Union (EU). *L. pistaciae* is reported as a polyphagous pest which, however, mainly affects plants of the genus *Pistacia*. Originating from Asia, it is widely distributed in pistachio producing countries of Central, South and West Asia. Within the EU, the pest has been reported from Cyprus and Greece. However, its precise distribution within Cyprus and Greece is unknown. It completes two generations per year and overwinters as a fully developed adult female. The eggs are hidden under the female's body and hatch around April. First-instar nymphs, crawlers, move on host plants for a short period of time before becoming permanently settled and initiating feeding, mainly on leaves but also on branches and fruits. Young females appear in early June and mature ones in late June. Plants for planting and fruits provide potential pathways for entry into the EU. Climate suitability suggests that it could further establish in large parts of the EU. In Iran, *L. pistaciae* is considered a devastating pest for cultivated pistachio. *L. pistaciae* was detected in Greece over 30 years ago with small population densities and without any records of damage. It was also found in Cyprus in 1967 and nowadays is not considered a major pest. Its ability to cause an impact in the EU is uncertain considering the lack of evidence on impact in Cyprus and Greece. Phytosanitary measures are available to reduce the likelihood of entry. While the fulfilment of the criterion on having an economic or environmental impact in the EU is associated with a key uncertainty, all the other criteria assessed by EFSA for consideration as a potential quarantine pest are met.

KEYWORDS

Diaspididae, Hemiptera, pest risk, pistachio oyster scale, *Pistacia* spp., plant health, plant pest, quarantine

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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

Lepidosaphes pistaciae (Arkhangelskaya) is one of a number of pests relevant to Annex 1C of the Terms of Reference (ToR) to be subject to pest categorisation to determine whether it fulfils the criteria of a potential Union quarantine pest 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 quarantine pest, risk reduction options will be identified.

1.3 | Additional information

This pest categorisation was initiated following the commodity risk assessment of *Prunus persica* and *P. dulcis* plants from Türkiye (EFSA PLH Panel, 2023), in which *L. pistaciae* was identified as a relevant pest of possible concern for the EU, not yet regulated, which could potentially enter the EU on *Prunus* spp. plants.

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 *L. pistaciae*, EFSA has consulted the NPPO of Greece and Cyprus.

2.1.2 | Literature search

A literature search on *L. pistaciae* was conducted at the beginning of the categorisation (i.e. 21/5/24) in the ISI Web of Science and Scopus bibliographic database, using the scientific name of the pest, the synonyms, old scientific names and the international common names as search term (for more details see Appendix E). 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 relevant papers identified in scientific literature databases as referred above in Section 2.1.2.

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) and FAOSTAT (Food and Agriculture Organization of the United Nations, Statistics).

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 *L. pistaciae* 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 October 2024 (release version 263.0) contained over 36.5 trillion base pairs from over 5.13 billion nucleotide sequences representing a wide range of formally described species (Sayers et al., 2024).

2.2 | Methodologies

The Panel performed the pest categorisation for *L. pistaciae*, following guiding principles and steps presented in the EFSA guidance on quantitative pest risk assessment (EFSA PLH Panel, 2018), the EFSA guidance on the use of the weight of evidence approach in scientific assessments (EFSA Scientific Committee, 2017), the protocol for pest categorisations as presented in the EFSA standard protocols for scientific assessments (EFSA PLH Panel, 2024; Kertesz et al., 2024) and the International Standards for Phytosanitary Measures No. 11 (FAO, 2013).

The criteria to be considered when categorising a pest as a potential Union quarantine pest (QP) are 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, 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. Whilst 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, 2018). Article 3 (d) of Regulation (EU)

2016/2031 refers to unacceptable social impact as a criterion for quarantine pest 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, and *Lepidosaphes pistaciae* Archangelskaya, 1930, is the accepted name.

Lepidosaphes pistaciae, first described by Archangelskaya in 1930 on *Pistacia vera* in Turkmenistan, is an insect within the order Hemiptera, suborder Sternorrhyncha and family Diaspididae. It is commonly known as the pistachio oystershell scale or yellow pistachio scale (EPPO, online). *L. pistaciae* was also described by Borchsenius in 1949 as *L. pistacicola* on *P. vera* and *P. mutica* in Turkmenistan and Armenia. Those species (*L. pistaciae* and *L. pistacicola*) were found to be the same species by Danzig in 1993 and declared the later one as junior synonym of *L. pistaciae*. Synonyms of *L. pistaciae* are *Mytilococcus pistaciae* Bodenheimer, 1943; *Pistaciaspis pistacicola*, Borchsenius, 1963 and *Pistaciaspis pistaciae*, Borchsenius, 1963 (García Morales et al., 2016). At present, the valid name remains *L. pistaciae*.

The EPPO code[1] (EPPO, 2019; Griessinger & Roy, 2015) for this species is: LEPSPI (EPPO, online).

3.1.2 | Biology of the pest

The biology of *L. pistaciae* was studied mainly in Iran and Türkiye, but many aspects about it remain unknown. The pest completes two generations per year in Iran and Greece (Katsoyannos & Stathas, 1993; Mehrnejad, 2020). Females have two immature instars while males have four, including prepupa and pupa stages (Plant Pests of the Middle East, online). Mature females of *L. pistaciae* overwinter on 2–3-year-old shoots of pistachio trees (Özgen & Karsavuran, 2011). In Uzbekistan, up to 30–40 individuals per pistachio leaf have been reported, with female adults located on both sides of the leaves, usually near the veins (Khusanov et al., 2023). In a single study in Greece, an average of 68 eggs per adult female was reported (Katsoyannos & Stathas, 1993). Eggs are laid under female scales and start hatching around April, both in Iran (in Isfahan) and Greece (in Attica) (Katsoyannos & Stathas, 1993; Mehrnejad, 2020). In Iran, crawlers start

[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 (EPPO, 2019; Griessinger & Roy, 2015).

appearing at the end of May and beginning of June, settling mainly on leaves but also on branches and fruits (Masjedian & Seyedoleslami, 2003). Second instar nymphs start forming a shell. Young females appear early June and mature females at the end of June. The highest population density occurs between mid and end of July. The second generation appears at the end of August, beginning of September. Crawlers settle on young shoots and overwinter as mature females. The crawlers of the second generation, settling on fruits and leaves, cannot complete their lifecycle to give overwintering females (Masjedian & Seyedoleslami, 2003). In general, mortality of crawlers is high due to abiotic factors (Beardsley Jr & Gonzalez, 1975). According to Özgen and Karsavuran (2011), *L. pistaciae* population density is higher on leaves than on shoots and fruits of pistachio trees.

3.1.3 | Host range/species affected

L. pistaciae has been reported from host plants of 11 families, mainly Anacardiaceae. However, Elekcioğlu and Kaydan (2021) refer to *L. pistaciae* as almost monophagous, attacking mainly *Pistacia* spp. in Türkiye. Similarly in Iran, it was not found on plant species other than *Pistacia* spp. (Moghadam & Tavakoli, 2010). Other reported hosts include *Ceratonia siliqua* and *Ficus carica* in Cyprus (Şişman & Ülgentürk, 2010), and *Malus sylvestris* and *Vitis vinifera* from Türkiye (Özgen & Karsavuran, 2005). The full host list is presented in details in Appendix A.

3.1.4 | Intraspecific diversity

To the best of the Panel's knowledge, no intraspecific diversity of ecological significance is reported for this species.

3.1.5 | Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes, there are methods available for the detection and morphological identification of *L. pistaciae*.

Symptoms

L. pistaciae can cause symptoms on branches, shoots, leaves and fruits. Infested pistachio leaves and nuts can turn yellow and purple locally where the scale has settled, and nuts can appear not fully developed with delayed ripening (Mehrnejad, 2020). In case of heavy infestations, *L. pistaciae* can lead to the death of branches, premature leaf drop and drying of the fruits of *Pistacia* (Danzig, 1993 as cited in EFSA PLH Panel, 2023). Note that the above symptoms are common to many other plant-sap-feeding insects and should not be considered as species-specific.

Detection

Careful visual examination of plants is an effective way for the detection of *L. pistaciae*. Adults can be visible on the trunk and branches, but also on leaves and fruits, as elongated and mussel-shaped scales (yellow on leaves and brown on bark; each with terminal exuviae). The size of the scales is small (less than 3 mm long) and when the population density is low, it might be difficult to detect by visual inspection. It can be confused with other species of *Lepidosaphes*, such as *Lepidosaphes ulmi*, *L. pini*, *L. pineti*, *L. piniphila* and *L. kuwacola* (EFSA PLH Panel, 2023; Watson, 2002).

Identification

The identification of *L. pistaciae* requires microscopic examination of slide-mounted female adults and verification of the presence of key morphological characteristics. A detailed morphological description and illustration of the adult female can be found in Hosseininaveh et al. (2016); Borkhsenius (1963) (in Russian), Danzig (1993) and Watson (2002).

The sequences corresponding to the cytochrome oxidase and 28S rRNA genes can be used for the molecular identification of Diaspididae in general, as well as *L. pistaciae* (Hosseininaveh et al., 2016).

Description

The adult female is narrow and elongate, straight or wavy, light or dark brown scale (Mehrnejad, 2020). The female scale cover is oyster like, 2.4–3.0 mm long, 1.0–1.8 mm wide, light or dark brown, flared posteriorly, flattened at edges, straight or wavy, central part moderately convex; larval exuviae on cephalic end, first shining yellow, second dark brown. The male scale cover is about 1.6 mm long, narrow, linear, very light brown, almost white; larval exuviae on cephalic end, light yellow

(Hosseininaveh et al., 2016). Generally, armoured scales are characterised by atrophied eyes and antennae and have no legs (Andersen et al., 2010; Hosseininaveh et al., 2016).

3.2 | Pest distribution

3.2.1 | Pest distribution outside the EU

L. pistaciae is a subtropical species of Asian origin and widely distributed in pistachio producing countries of Central, South and West Asia (García Morales et al., 2016; Figure 1). The record of Azerbaijan by Mustafayeva (2016) was considered uncertain and not included in the map, as the paper is referring to its parasitoid and not to the actual pest (for more details see Appendix B).

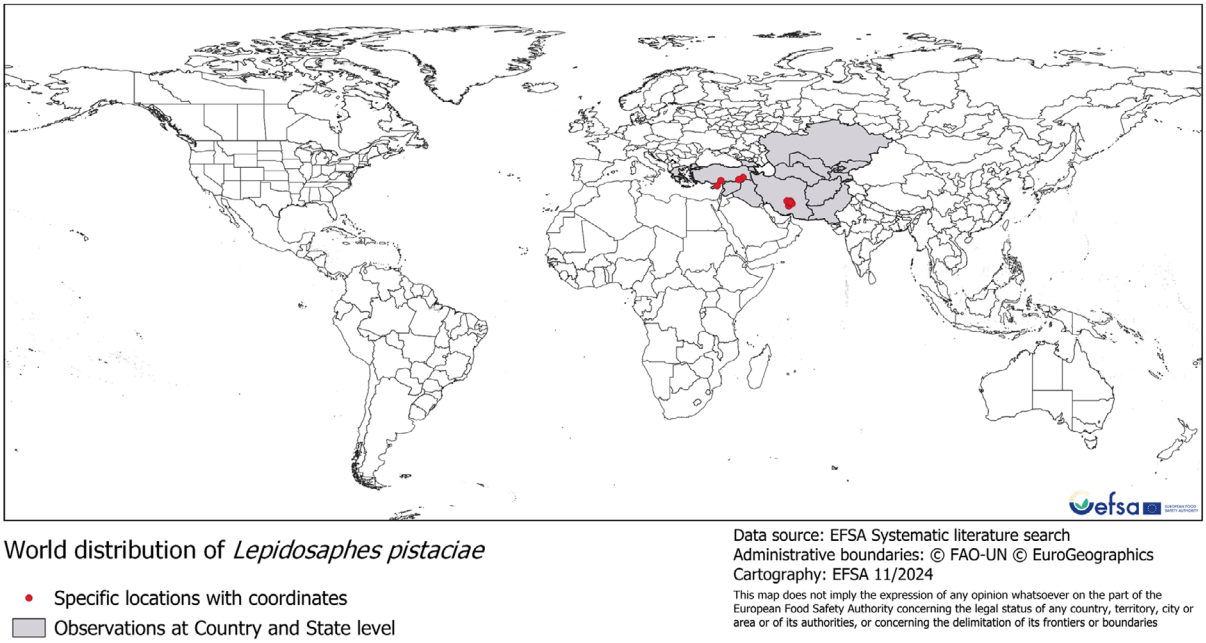

FIGURE 1 Global distribution of *Lepidosaphes pistaciae* (Data source: Literature; for details see Appendix B).

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, *L. pistaciae* has been reported in Greece and Cyprus, but no details are available on the current distribution in these countries.

In Greece, *L. pistaciae* was first reported in 1990 on pistachio (*P. vera*) and terebinth (*P. terebinthus*) in the region of Attica (Anagnou-Veroniki et al., 2008; Katsoyannos & Stathas, 1993). It was found in low population densities on young shoots, leaves and fruits (Katsoyannos & Stathas, 1993; Mourikis et al., 1998). During the literature search, no recent studies on its distribution in Greece were identified. In Cyprus, the pest was found in 1967 on pistachio (*P. vera)* and terebinth (*P. terebinthus*), with heavy infestations on pistachio, but no further details are provided (Georghiou, 1977). Additionally, according to Şişman and Ülgentürk (2010), *L. pistaciae* was found in the north part of the country on carob (*C. siliqua*) and fig (*F. carica)* trees in 2006 and 2007, respectively. According to the Cypriot NPPO (2024), the official status of *L. pistaciae* is: *'Present, no details'*.

3.3 | Regulatory status

3.3.1 | Legislation addressing the pest

L. pistaciae is not listed in Annex II of Commission Implementing Regulation (EU) 2019/2072, an implementing act of Regulation (EU) 2016/2031, or amendments to high-risk plants Regulation (EU) 2018/2019, or in any emergency plant health legislation.

3.3.2 | Legislation addressing the hosts

EU phytosanitary legislation prohibits a number of *L. pistaciae* hosts from entering the EU territory (Table 2 and the text below Table 2).

TABLE 2 List of plants, plant products and other objects that are *Lepidosaphes pistaciae* 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**
7.	Isolated bark of *Populus* L.	ex 1404 90 00 ex 4401 40 90	The Americas
8.	Plants for planting of […] *Malus* Mill., *Prunus* L., *Pyrus* L. and *Rosa* L., other than dormant plants free from leaves, flowers and fruits	ex 0602 10 90 ex 0602 20 20 ex 0602 20 80 ex 0602 40 00 ex 0602 90 41 ex 0602 90 45 ex 0602 90 46 ex 0602 90 47 ex 0602 90 48 ex 0602 90 50 ex 0602 90 70 ex 0602 90 91 ex 0602 90 99	Third countries other than Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canary Islands, Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, Russia (only the following parts: Central Federal District (Tsentralny federalny okrug), Northwestern Federal District (Severo-Zapadny federalny okrug), Southern Federal District (Yuzhny federalny okrug), North Caucasian Federal District (Severo-Kavkazsky federalny okrug) and Volga Federal District (Privolzhsky federalny okrug)), San Marino, Serbia, Switzerland, Türkiye, Ukraine and the United Kingdom
9.	Plants for planting of […] *Malus* Mill., *Prunus* L. and *Pyrus* L. and their hybrids, and […] other than seeds	ex 0602 10 90 ex 0602 20 20 ex 0602 90 30 ex 0602 90 41 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	Third countries other than Albania, Algeria, Andorra, Armenia, Australia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canada, Canary Islands, Egypt, Faeroe Islands, Georgia, Iceland, Israel, Jordan, Lebanon, Libya, Liechtenstein, Moldova, Monaco, Montenegro, Morocco, New Zealand, North Macedonia, Norway, Russia (only the following parts: Central Federal District (Tsentralny federalny okrug), Northwestern Federal District (Severo-Zapadny federalny okrug), Southern Federal District (Yuzhny federalny okrug), North Caucasian Federal District (Severo-Kavkazsky federalny okrug) and Volga Federal District (Privolzhsky federalny okrug)), San Marino, Serbia, Switzerland, Syria, Tunisia, Türkiye, Ukraine, the United Kingdom (1) and United States other than Hawaii

No prohibitions are applied specifically on *Pistacia* spp., important host plant species of *L. pistaciae*.

Although certain host genera are prohibited from entering the EU, some are permitted from Armenia, Georgia, Russia and Türkiye (i.e. item 8 and 9, Table 2) where *L. pistaciae* occurs. However, *Malus* Mill. and *Prunus* L. fall under the High-Risk Plants legislation (Regulation (EU) 2018/2019; see below), excluding *Pyrus* L.

Populus L. *Malus* Mill. and *Prunus* L. plants other than seeds, in vitro material or naturally or artificially dwarfed woody plants, are listed in Commission Implementing Regulation (EU) 2018/2019 as high-risk plants for planting, and their import into the Union is prohibited pending risk assessment (EU 2018/2019).

Of note, a derogation for up to 2-year-old dormant, free of leaves, unrooted cuttings of *P. persica* and *P. dulcis* in Türkiye is in place since May 2024 ((EU) 2020/1213 amended by (EU) 2024/1457), re-opening the import of the specific commodities from Türkiye into the EU, following the commodity risk assessment performed by EFSA (EFSA PLH Panel, 2023).

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, *L. pistaciae*, already present in Greece and Cyprus, could re-enter the EU via the import of host plants for planting (excluding seed and pollen) or on cut branches and fruits.

Comment on plants for planting as a pathway.

Plants for planting provide the main pathway to enter the EU.

Possible pathways of entry are plants for planting, fruits and cut branches (EFSA PLH Panel, 2023; Table 3).

TABLE 3 Potential pathways for entry of *Lepidosaphes pistaciae* 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	All life stages	Plants for planting that are hosts of *L. pistaciae* and are prohibited from being imported from third countries (Regulation 2019/2072, Annex VI) are listed in Table 2. Plants for planting from third countries require a phytosanitary certificate (Regulation 2019/2072, Annex XI, Part A).
Cut branches	All life stages	Foliage, branches and other parts of plants of *Prunus* spp., without flowers or flower buds, being goods of a kind suitable for bouquets or for ornamental purposes, fresh from third countries where the species occur require a phytosanitary certificate (Regulation 2019/2072, Annex XI, Part A). Foliage, branches and other parts of plants of *Malus* Mill. and *Pyrus* L. *of L. pistaciae*, without flowers or flower buds and grasses, mosses and lichens, being goods of a kind suitable for bouquets or for ornamental purposes, fresh, dried, dyed, bleached, impregnated or otherwise prepared: – Fresh: ex 0604 20 90 from third countries other than Switzerland require a phytosanitary certificate for their introduction into a protected zone from certain third countries of origin or dispatch (Regulation 2019/2072, Annex XII, Part C).
Fruits	All life stages	Fruits from third countries require a phytosanitary certificate to import into the EU (2019/2072, Annex XI, Part A).

The summary of annual imports of host commodities (apples, apricots, figs and grapes) from countries where the pest is known to occur are provided in Table 4 and in Appendix D.1.–D.4. Even though, *Pistacia* spp. are major hosts, imported pistachio nuts are not considered a pathway.

TABLE 4 Summary of EU annual imports of some *Lepidosaphes pistaciae* host plants from countries where *L. pistaciae* is present, 2018–2022 (100 kg) Source: Eurostat accessed on 12 August 2024.

Commodities	Code	2018	2019	2020	2021	2022
Fresh apples	1080810	21,908.34	2705.54	19,925.64	9624.89	4148.26
Fresh apricots	18091000	68,642.75	48,912.41	105,325.60	71,132.74	69,345.61
Fresh figs	08042010	114,596.47	131,193.76	147,007.05	140,446.21	145,396.49
Grapes (fresh or dried)	080610	1,842,347.73	1,798,591.53	1,693,491.35	1,887,355.42	1,783,005.31

Notifications of interceptions of harmful organisms began to be compiled in EUROPHYT in May 1994 and in TRACES in May 2020. As of 2 July 2024, there were no records of interception of *L. pistaciae* in the EUROPHYT and TRACES databases.

3.4.2 | Establishment

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

Yes, the pest is already established in the EU. It was first recorded in Cyprus in 1967 and in Greece in 1990.

Further establishment could occur in large parts of the EU, based on the climate suitability and host availability.

Climatic mapping is the principal method for identifying areas that could provide suitable conditions for the establishment of a pest, taking key abiotic factors into account (Baker, 2002). One of the approaches used in EFSA pest categorisations is

based on the Köppen–Geiger climate classification (version of Kottek et al., 2006 and Rubel et al., 2017) which gives a first global estimate based on the climate types present in Europe. The availability of hosts is considered in Section 3.4.2.1. Climatic factors are considered in Section 3.4.2.2.

3.4.2.1 | *EU distribution of main host plants*

The pistachio production area in the EU between 2014 and 2017 is shown in Table 5. Other cultivated host plants of the pest, which are economically important for the EU, are apples, apricots, figs and grapes (Appendix C.1.-C.4.).

TABLE 5 Production area (in tonnes) of pistachios (in shell), major host of *Lepidosaphes pistaciae*, in the EU. Source: FAOSTAT https://www.fao.org/faostat/en/#data/QCL (Accessed 4 July 2024).

Year*/country	2014	2015	2016	2017
Greece	8566.11	9745.26	11,264.92	11,836
Italy	3554.50	3868.00	3649.40	3873
Spain	2626.00	2598.67	5618.00	7545
Total	14,769.61	16,221.93	20,542.32	23,264

*The most recent data were available from FAOSTAT before 2017. Eurostat does not provide any data specifically on pistachio production, but only in nut production as a whole.

Greece, Italy and Spain are the main producers of pistachio in the EU, with Spain increasing its planted acreage enormously over the last 5 years (48,000 hectares planted in 2022) (LVVN, online). In Spain, pistachio cultivation is distributed in different regions, mainly in Castilla-La Mancha, where approximately 80% of the pistachio plantations are located, producing 14,161 tonnes of shelled pistachio in 2022. Italian pistachio production is mainly located in Sicily, reaching 2000 tonnes on 5000 hectares (Agróptimum, online). In Greece, pistachio production is located both in the central and northern parts of the country, but also in Aegina Island (Bartzas & Komnitsas, 2017), reaching 8000 tonnes on 10,000 hectares in 2022 (Agróptimum, online).

3.4.2.2 | *Climatic conditions affecting establishment*

L. pistaciae occurs mainly in Asia. In the EU it is already present in Greece and Cyprus, however its current distribution suggests that there are other regions in the EU with climate types suitable to its establishment, based on Köppen–Geiger classification (Figure 2A,B) shows the world distribution of selected Köppen–Geiger climate types (Kottek et al., 2006) that occur in the EU, and which occur in locations and regions where *L. pistaciae* has been reported (BSh, BSk, Cfa, Cfb, Csa, Csb and Dfb). Climate Dfc was removed as it was assumed that the scale cannot survive in colder climates that are present only in a very limited number of pixels in Armenia and in some western provinces of Türkiye where the pest was reported. On the contrary, it cannot be excluded that climate Dfb is suitable as this is the main climate type in the same regions. Climate Cfb, the main climate in Central Europe, cannot also be excluded as it is the main climate of the provinces of Northern Türkiye where the scale was reported. However, it must be noted that Köppen–Geiger is a climate classification whose climate types can include a broad range of different temperature and precipitation conditions. In addition, it does not account for microclimatic conditions that might affect the establishment of the species.

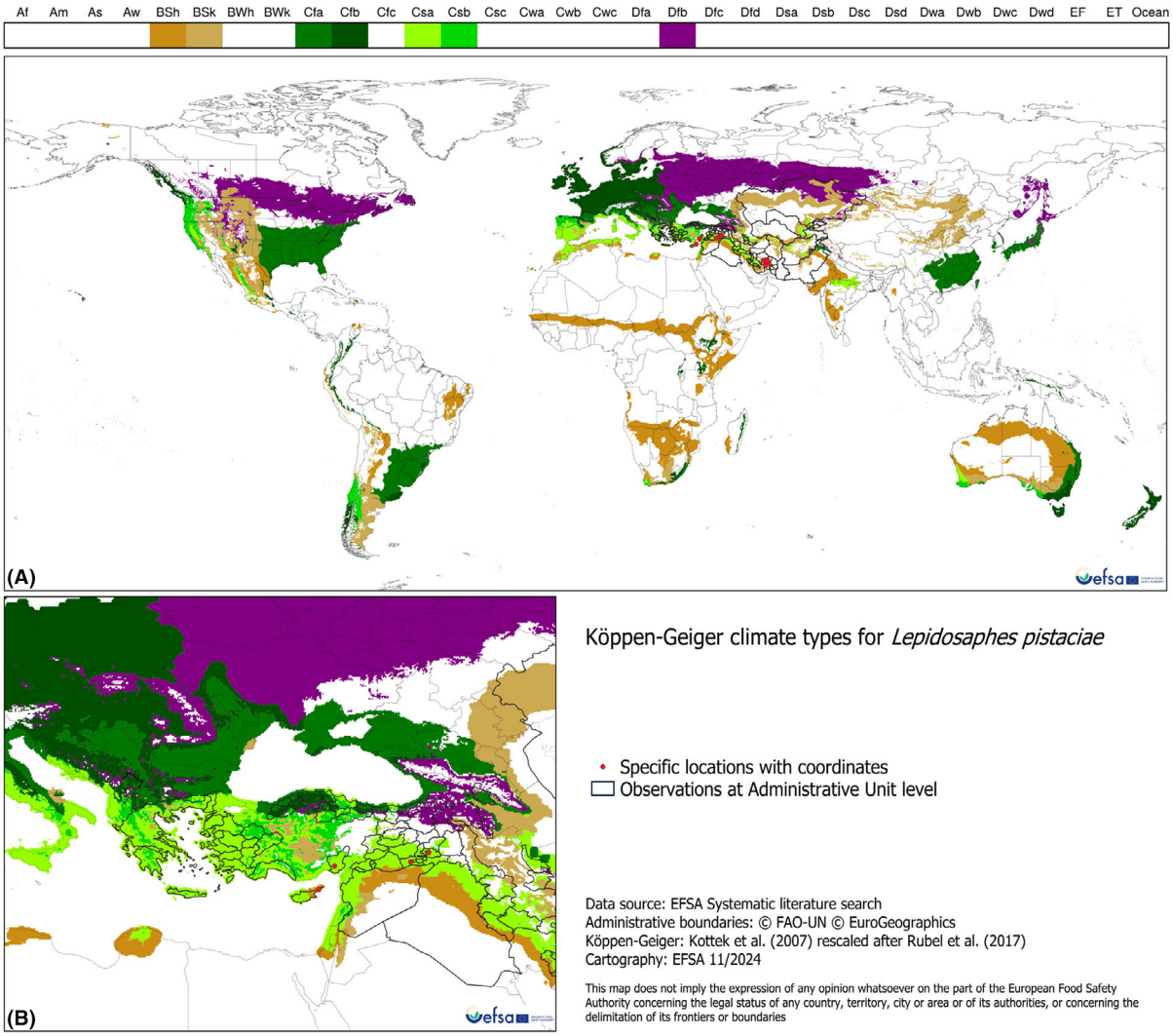

FIGURE 2 (A) World distribution of the Köppen–Geiger climate types that occur in the EU and in countries where *Lepidosaphes pistaciae* occurs (red dots represent specific coordinate locations where *L. pistaciae* was reported). The Dfc climate has limited distribution in the area of pest occurrence and therefore it was removed. (B) Zoom-in map of the areas where *L pistaciae* is present and have Dfb and Cfb climate type as well.

3.4.3 | Spread

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

Plants for planting, fruits, plant materials of any kind (that can transfer *L. pistaciae* specimens in a protected site, on the bark wounds, roots, stems, leaves), hitchhiking in humans, animals and wind are the main ways of spread.

Comment on plants for planting as a mechanism of spread.

The trade of infested plants for planting is one of the main pathways of *L. pistaciae* spread within the EU territory.

Crawlers may be carried to neighbouring plants by their own movement, wind or by hitchhiking on clothing, equipment or animals (Nazari et al., 2020; Özgen & Karsavuran, 2011). Plants for planting provide a main spread mechanism for *L. pistaciae* over long distances.

3.5 | Impacts

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

L. pistaciae is a recognised pest in Iran and Türkiye, causing severe damage on *Pistacia* spp. It has been present in Greece for at least 33 years, and in Cyprus since 1967 with no evidence of severe impact. However, it cannot be excluded that economic or environmental impacts could occur in the future.

In Iran, the scale attacks both cultivated and wild pistachios, and is restricted to *Pistacia* spp. with no reports on other hosts. *L. pistaciae* is an important pest especially in the Kerman region in Iran, main area of pistachio production, causing severe losses of commercial pistachio (Rouhani et al., 2018). It is reported as one of the most widely distributed and destructive scales in pistachio plantations (Taghizadeh & Safavi, 1960; Farahbakhsh, 1961; Mehrnejad, 2001; Hosseininaveh et al., 2016; in Mehrnejad, 2020). The insect sucks the content of parenchyma cells causing damage to branches, shoots, leaves and fruits (Hosseininaveh et al., 2016). In some cases, it causes delayed shoot growth and shell splitting. The leaves and nuts turn yellow and purple on the feeding site. The nuts appear smaller, not fully developed and ripening takes longer. The scale weakens the host plant, and higher infestations cause the death of branches and twigs (Mehrnejad, 2020). In Türkiye, *L. pistaciae* affects mainly pistachio cultivation areas and is considered an important pest especially for the Siirt region, where up to 100% infection rate was recorded (Özgen & Karsavuran, 2011). No records of impact were found on host plants other than *Pistacia* spp.

In Greece, the pest was first observed in 1990 on pistachio (*P. vera*) and terebinth (*P. terebinthus*) in low population densities on fruits (Anagnou-Veroniki et al., 2008; Katsoyannos & Stathas, 1993; Mourikis et al., 1998). It settles on young shoots and branches causing deformities and drying of the host plants (Anagnou-Veroniki et al., 2008). No recent studies were identified during the literature search concerning the impact and presence of *L. pistaciae* in Greece. In Cyprus, according to the Cypriot NPPO *'L. pistaciae is not considered a major pest in Cyprus'* (NPPO of Cyprus, 2024). There is thus uncertainty on the impact in Greece and Cyprus and consequently in the EU.

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, certain hosts are already prohibited from entering the EU (see Section 3.3.2). Specific hosts that are permitted to enter require a phytosanitary certificate and a proportion of consignments is inspected. Additional options are available to reduce the likelihood of pest entry into the EU.

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, 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 (Blue underline = Zenodo doc, Blue = WIP)	RRO summary	Risk element targeted (entry/establishment/spread/impact)
Require pest freedom	As a pest with low mobility, a risk reduction option could be to source plants from a pest free area (PFA), or pest free place of production or pest free production site	Entry/Spread
Growing plants in isolation	Growing plants in insect proof place of production or in a place with complete physical isolation, when feasible, could be an effective measure to mitigate the likelihood of entry and spread of *L. pistaciae*.	Entry (reduce contamination/infestation)/Spread/Impact
Roguing and pruning	Roguing (removal of infested plants) and pruning (removal of infested plant parts only without affecting the viability of the plant) can reduce the population density of the pest.	Entry/Spread/Impact
Biological control and behavioural manipulation	*Lepidosaphes pistaciae* is widely attacked by predators, e.g. predatory mites and coccinellids as well as parasitoids (Mehrnejad, 2020). Three parasitoid species were found attacking *L. pistaciae*; *Coccobius annulicornis* Ratzeburg (Hym.: Aphelinidae), *Aphytis* sp. near aonidiae (Mercet) (Hym.: Aphelinidae) and *Zaomma lambinus* (Walker) (Hym.: Encyrtidae) through a wide field survey in pistachio plantations in the Kerman province, in southern Iran (Emami & Mehrnejad, unpublished, cited in Mehrnejad, 2020). Additionally, Jalaeian et al. (2013) reported three parasitoid wasp species, *C. annulicornis*, *Z. lambinus* and *Ablerus* sp. that parasitise this scale in the central parts of the country. From the group of predators, particularly mites, e.g. *Neophyllobius pistaciae* Bolland and Mehrnejad (Acarina: Camerobiidae) and *Cheletogenes* ornatus (Canestrini & Fanzago) (Acarina: Cheyletidae) (Bolland & Mehrnejad, 2001; Mehrnejad & Ueckermann, 2001) as well as predatory ladybirds including *Chilocorus bipustulatus* (Linnaeus), *Exochomus nigripennis* (Erichson) (both Col.: Coccinellidae) (Mehrnejad, 2014) are important. The predatory beetle, *Cybocephalus fodori* minor Endrödy-Younga, 1968 (Coleoptera: Cybocephalidae) (Kolahdooz-Shahroodi et al., 2006) widely lives on contaminated trees throughout the country (Mehrejad, 2020). *Coccobius pistacicolus* (Yasnosh, 1958) was also found to attack the scale (Mustafayeva, 2016). *Aphytis* sp., *Chilocorus bipustulatus* and *Cybocephalus fodori* were observed parasitising *L. pistaciae* up to 40% during spring on *P. vera* and *P. terebinthus* trees, in Athens (Katsoyannos & Stathas, 1993)	Entry/Impact
Chemical treatments on crops including reproductive material	According to Mehrnejad (2020), when in high population densities, a chemical application is required against the scale. However, any chemical treatments should target first nymphal instars, highly susceptible due to lack of a scale.	Entry/Establishment/Impact
Cleaning and disinfection of facilities, tools and machinery	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). The measures addressed in this information sheet are: washing, sweeping and fumigation.	Entry/Spread
Waste management	Treatment of the waste (deep burial, composting, incineration, chipping, production of bio-energy…) in authorised facilities and official restriction on the movement of waste.	Establishment/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, 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	ISPM 5 (FAO, 2023) defines inspection 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. The effectiveness of sampling and subsequent inspection to detect pests may be enhanced by including trapping and luring techniques.	Establishment/Spread

TABLE 7 (Continued)

Supporting measure (Blue underline = Zenodo doc, blue = WIP)	Summary	Risk element targeted (entry/establishment/spread/impact)
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.	Entry/Spread
Sampling	According to ISPM 31 (FAO, 2008), 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.	Entry
Phytosanitary certificate and plant passport	According to ISPM 5 (FAO, 2023) a phytosanitary certificate and a plant passport are official paper documents or their official electronic equivalents, consistent with the model certificates of the IPPC, attesting that a consignment meets phytosanitary import requirements: (a) export certificate (import) (b) plant passport (EU internal trade)	Entry
Certified and approved premises	Mandatory/voluntary certification/approval of premises is a process including a set of procedures and of actions implemented by producers, conditioners and traders contributing to ensure the phytosanitary compliance of consignments. It can be a part of a larger system maintained by the NPPO in order to guarantee the fulfilment of plant health requirements of plants and plant products intended for trade. Key property of certified or approved premises is the traceability of activities and tasks (and their components) inherent the pursued phytosanitary objective. Traceability aims to provide access to all trustful pieces of information that may help to prove the compliance of consignments with phytosanitary requirements of importing countries.	Entry
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.	Entry / Spread
Delimitation of Buffer zones	ISPM 5 (FAO, 2023) 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'. 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 PFA.	Spread / Impact
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*

- The small size of the scales makes them difficult to detect and identify, creating a serious problem for plant quarantine specialists (Hosseininaveh et al., 2016; Kondo et al., 2008).
- Low infestation can be overlooked. Crawlers can hide in wounds or underneath leaves (EFSA PLH Panel, 2023).

3.7 | Uncertainty

There is a key uncertainty around the ability of the pest to cause impact in the EU, given the lack of impact reports from Greece and Cyprus where the pest is already present and the lack of any reports on impact on host plants other than pistachio.

4 | CONCLUSIONS

While the fulfilment of the criterion on having an economic or environmental impact in the EU is associated with a key uncertainty, all the other criteria assessed by EFSA for consideration as a potential Union quarantine pest are met. Table 8 provides a summary of the PLH Panel conclusions.

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 (3.1)	The identity of the pest is clearly defined and *Lepidosaphes pistaciae* Arkhangelskaya 1930 is the accepted name.	None
Absence/presence of the pest in the EU (3.2)	The pest has a restricted distribution in the EU territory. It was reported in Cyprus and Greece, however, its precise distribution within Cyprus and Greece is unknown.	None
Pest potential for entry, establishment and spread in the EU (3.4)	*L. pistaciae* is able to re-enter into, become established and spread in new areas in the EU territory. The main pathways are: • plants for planting • fruits • cut branches	None
Potential for consequences in the EU (3.5)	*L. pistaciae* is considered an important and widespread pest in some Asian countries. However, it occurs in Greece and Cyprus for several years with no evidence of economic or environmental damage.	Uncertainty exists whether *L. pistaciae* will have an economic or environmental impact in the EU, considering the lack of evidence on impact in Cyprus and Greece and the restricted distribution of its main host plants in the EU.
Available measures (3.6)	There are measures available to prevent the entry, establishment and spread of *L. pistaciae* within the EU.	None
Conclusion (4)	While the fulfilment of the criterion on having an economic or environmental impact in the EU is associated with a key uncertainty, all the other criteria assessed by EFSA for consideration as a potential quarantine pest are met.	
Aspects of assessment to focus on/ scenarios to address in future if appropriate:	Studies of *L. pistaciae* in Greece and Cyprus and its host range would help reduce uncertainties within this pest categorisation.	

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
PFPP	pest free production place
PFPS	pest free production site
PFA	pest free production area
PLH	EFSA Panel on Plant Health
PZ	Protected Zone
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, 2023).
Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 2023).
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, 2023).
Eradication (of a pest)	Application of phytosanitary measures to eliminate a pest from an area (FAO, 2023).
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2023).
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 & 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, 2023).

Pathway	Any means that allows the entry or spread of a pest (FAO, 2023).
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, 2023).
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, 2023).
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, 2023).

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REFERENCES

Agróptimum. (online). Pistachio cultivation in Spain. https://agroptimum.com/en/cultivo-del-pistacho-en-espana

Anagnou-Veroniki, M., Papaioannou-Souliotis, P., Karanastasi, E., & Giannopolitis, C. N. (2008). New records of plant pests and weeds in Greece, 1990–2007. *Hellenic Plant Protection Journal*, *1*(2), 55–78.

Andersen, J. C., Wu, J., Gruwell, M. E., Gwiazdowski, R., Santana, S. E., Feliciano, N. M., … Normark, B. B. (2010). A phylogenetic analysis of armored scale insects (Hemiptera: Diaspididae), based upon nuclear, mitochondrial, and endosymbiont gene sequences. *Molecular Phylogenetics and Evolution*, *57*(3), 992–1003.

Baker, R. H. A. (2002). Predicting the limits to the potential distribution of alien crop pests. In G. J. Hallman & C. P. Schwalbe (Eds.), *Invasive arthropods in agriculture: Problems and solutions* (pp. 207–241). Science Publishers Inc.

Bartzas, G., & Komnitsas, K. (2017). Life cycle analysis of pistachio production in Greece. *Science of the Total Environment*, *595*, 13–24.

Batsankalashvili, M., Kaydan, M. B., Kirkitadze, G., & Japoshvili, G. (2017). Updated checklist of scale insects (Hemiptera: Coccomorpha) in Sakartvelo (Georgia). *Annals of Agrarian Science*, *15*(2), 252–268.

Beardsley, J. W., Jr., & Gonzalez, R. H. (1975). The biology and ecology of armored scales. *Annual Review of Entomology*, *20*(1), 47–73.

Bodenheimer, F. S. (1943). *A first survey of the Coccoidea of Iraq*. Printed at the Government Press.

Bolland, H. R., & Mehrnejad, M. R. (2001). *Neophyllobius pistaciae* spec. Nov. (Acari: Camerobiidae) from Iran. *International Journal of Acarology*, *27*, 49–53.

Borchsenius, N. S. (1949). A new genus and new species of hard and soft scales (Homoptera, Coccoidea) of USSR fauna. *Entomologicheskoe Obozrenye*, *30*, 334–353.

Borkhsenius, N. S. (1963). The revision of the genus *Lepidosaphes* Shimer (Coccoidea, Homoptera, Insecta) [English Summ]. *ZOOL ZHUR*, *42*(8), 1161–1174.

Danzig, E. M. (1993). [Fauna of Russia and neighbouring countries. Rhynchota, volume X: Suborder scale insects (coccinea): Families Phoenicococcidae and Diaspididae.] 'Nauka' Publishing House St. Petersburg 452 pp.

Dutch Ministry of Agriculture, Fisheries, Food Security and Nature (LVVN). (Online). Agroberichten Buitenland, Spain: Led by pistachios, nuts continue their expansion in 2020. https://www.agroberichtenbuitenland.nl/actueel/nieuws/2022/01/04/spain-led-by-pistachios-nuts-continue-their-expansion-in-2020

EFSA PLH Panel (EFSA Panel on Plant Health), Jeger, M., Bragard, C., Caffier, D., Candresse, T., Chatzivassiliou, E., Dehnen-Schmutz, K., Gregoire, J.-C., Jaques Miret, J. A., MacLeod, A., Navajas Navarro, M., Niere, B., Parnell, S., Potting, R., Rafoss, T., Rossi, V., Urek, G., Van Bruggen, A., Van Der Werf, W., … Gilioli, G. (2018). Guidance on quantitative pest risk assessment. *EFSA Journal*, *16*(8), 5350. https://doi.org/10.2903/j.efsa.2018.5350

EFSA PLH Panel (EFSA Panel on Plant Health), Bragard, C., Baptista, P., Chatzivassiliou, E., Gonthier, P., Jaques Miret, J. A., … Yuen, J. (2023). Commodity risk assessment of *Prunus persica* and *P. dulcis* plants from Türkiye. *EFSA Journal*, *21*(1), e07735. https://doi.org/10.2903/j.efsa.2023.7735

EFSA PLH Panel (EFSA Panel on Plant Health), Bragard, C., Baptista, P., Chatzivassiliou, E., Di Serio, F., Gonthier, P., … Thulke, H. H. (2024). Standard protocols for plant health scientific assessments. *EFSA Journal*, *22*(9), e8891. https://doi.org/10.2903/j.efsa.2024.8891

EFSA Scientific Committee, Hardy, A., Benford, D., Halldorsson, T., Jeger, M. J., Knutsen, H. K., More, S., Naegeli, H., Noteborn, H., Ockleford, C., Ricci, A., Rychen, G., Schlatter, J. R., Silano, V., Solecki, R., Turck, D., Benfenati, E., Chaudhry, Q. M., Craig, P., … Younes, M. (2017). Scientific Opinion on the guidance on the use of the weight of evidence approach in scientific assessments. *EFSA Journal*, *15*(8), 4971. https://doi.org/10.2903/j.efsa.2017.4971

Elekcioğlu, N. Z., & Kaydan, M. (2021). Scale insect (Hemiptera: Sternorryncha: Coccomorpha) species on medicinal and aromatic plants in Adana (Turkey). *Plant Protection Bulletin*, *61*(4), 5–12.
EPPO (European and Mediterranean Plant Protection Organization). (2019). EPPO codes. https://www.eppo.int/RESOURCES/eppo_databases/eppo_codes
EPPO (European and Mediterranean Plant Protection Organization). (online). EPPO Global Database. https://gd.eppo.int
EUROPHYT. (online). European Union Notification System for Plant Health Interceptions – EUROPHYT. https://ec.europa.eu/food/plant/plant_health_biosecurity/europhyt/index_en.htm
FAO (Food and Agriculture Organization of the United Nations). (2008). *ISPM (international standards for phytosanitary measures) No 31. Methodologies for sampling of consignments* (p. 19). FAO. https://www.ippc.int/static/media/files/publication/en/2016/11/ISPM_31_2008_Sampling_of_consignments_EN.pdf
FAO (Food and Agriculture Organization of the United Nations). (2013). *ISPM (international standards for phytosanitary measures) No 11. Pest risk analysis for quarantine pests* (p. 36). FAO. https://www.ippc.int/sites/default/files/documents/20140512/ispm_11_2013_en_2014-04-30_201405121523-494.65%20KB.pdf
FAO (Food and Agriculture Organization of the United Nations). (2023). *ISPM (international standards for phytosanitary measures) No 5. Glossary of phytosanitary terms* (p. 40). FAO. https://assets.ippc.int/static/media/files/publication/en/2023/07/ISPM_05_2023_En_Glossary_PostCPM-17_2023-07-12_Fixed.pdf
FAOSTAT (Food and Agriculture Organization of the United Nations, Statistics). (2024). https://www.fao.org/faostat/en/#data/TM
Farahbakhsh, Q. (1961). The list of major pests on agricultural crops in Iran. *Plant Protection Organisation*, *1*, 153.
García Morales, M., Denno, B. D., Miller, D. R., Miller, G. L., Ben-Dov, Y., & Hardy, N. B. (2016). ScaleNet: A literature-based model of scale insect biology and systematics. *Database*, *2016*, bav118. https://doi.org/10.1093/database/bav118
Georghiou, G. P. (1977). The insects and mites of Cyprus. With emphasis on species of economic importance to agriculture, forestry, man, and domestic animals. Benaki Phytopathological institute (BPI), Kiphissia, Athens, Greece. 347.
Griessinger, D., & Roy, A.-S. (2015). EPPO codes: a brief description. https://www.eppo.int/media/uploaded_images/RESOURCES/eppo_databases/A4_EPPO_Codes_2018.pdf
Hosseininaveh, F., Nozari, J., Kaydan, M. B., & Hosseininaveh, V. (2016). Molecular and morphological identification of pistachio armored scale insects (Hemiptera: Diaspididae), with description of a new species. *Zootaxa*, *4200*(4), 523–543.
Jalaeian, M., Mansouri, M., & Karimi-Malati, A. (2013). Distribution and morphological characteristics of parasitoids and hyperparasitoids of *Lepidosaphes pistaciae* (Hem: Diaspididae) in Isfahan province. *Plant Pest Research*, *3*(2), 19–31.
Jamshidi, A., Vahedi, H. A., Zamani, A. A., & Farhadi Bansoleh, B. (2021). Pistachio orchard pests in kermanshah province and the first report of *Thrips minutissimus*. *IAU Entomological Research Journal*, *12*(4), 283–293.
Katsoyannos, P., & Stathas, G. I. (1993). First record in Greece and phenology of *Lepidosaphes pistaciae* Archangel'skaa (Homoptera: Diaspididae) in Attica. In *Proceedings of the 5th Panhellenic entomological congress* (pp. 114–119) in Greek.
Kertesz, V., Pautasso, M., Gobbi, A., Golic, D., Maiorano, A., Sfyra, O., & Stancanelli, G. (2024). EFSA standard protocol for pest categorisation. *Zenodo*, *1*, 1–30. https://doi.org/10.5281/zenodo.12909423
Khusanov, A., Sobirov, O., Ilyosbek, I., & Saidjaxonova, D. (2023). АНДИЖОН ВИЛОЯТИ ШАРОИТИДА УНСИМОН ҚУРТЛАРНИНГ (HOMOPTERA, COCCOINEA) ТАРҚАЛИШИГА ОИД. (in Uzbek).
Kiriukhin, G. (1946). Les insectes nuisibles au pistacier en. *Iran Entomologie et Phytopathologie Appliquees*, *1*, 8–24.
Kolahdooz-Shahroodi, J., Seyedoleslami, H., Ebadi, R., & Hatami, B. (2006). Laboratory study of cycle and feeding rate of the beetle *Cybocephalus fodori* minor (Col.: Cybocephalidae) predator of pistachio oyster shell scale *Lepidosaphes pistaciae* (Hom.: Diaspididae). *Journal of Science and Technology of Agriculture and Natural Resources*, *10*, 255–267.
Kondo, T., Penny, J., & Williams, D. (2008). Coccidology. The study of scale insects (Hemiptera: Sternorrhyncha: Coccoidea). *Ciencia y Tecnología Agropecuaria*, *9*(2), 55–61.
Kottek, M., Grieser, J., Beck, C., Rudolf, B., & Rubel, F. (2006). World map of the Köppen_Geiger climate classification updated. *Meteorologische Zeitschrift*, *15*, 259–263. https://doi.org/10.1127/0941-2948/2006/0130
Kozimjon, Z., Tojimatovich, S. O., Solidjonovna, A. Z., Bozorboyo'g'li, I. I., & Sobirjonovna, S. M. (2021). Scale insects (Homoptera, Coccoidea) of Fergana Valley's fruit plants. *JournalNX*, *7*(8), 19–25.
Masjedian, H., & Seyedoleslami, H. (2003). *Bioecology of pistachio oyster shell scale, Lepidosaphes pistaciae Archangelskaya*. Diaspididae. in Isfahan.
Mehrnejad, M. R. (2001). The current status of pistachio pests in Iran. *Cahiers Options Méditerranéennes*, *56*, 315–322.
Mehrnejad, M. R. (2014). *The pests of pistachio trees in Iran, natural enemies and control*. Sepehr publication.
Mehrnejad, M. R. (2020). Arthropod pests of pistachios, their natural enemies and management. *Plant Protection Science*, *56*(4), 231–260.
Mehrnejad, M. R., & Ueckermann, E. (2001). Mites (Arthropoda, Acari) associated with pistachio trees (Anacardiacae) in Iran (I). *Systematic and Applied Acarology Special Publication*, *6*, 1–12.
Moghadam, M., & Tavakoli, M. (2010). *Scale insects of the central Zagros region in Iran*. Coccoidea.
Moghaddam, M. (2013). An annotated checklist of the scale insects of Iran (Hemiptera, Sternorrhyncha, Coccoidea) with new records and distribution data. *ZooKeys*, *334*, 1.
Mourikis, P. A., Tsourgianni, A., & Chitzanidis, A. (1998). Pistachio nut insect pests and means of control in Greece. *Acta Horticulturae*, *470*, 604–611. https://doi.org/10.17660/ActaHortic.1998.470.85
Mustafayeva, G. A. (2016). Aphelinid wasps (Hymenoptera, Aphelinidae)–parasitoids of scale insects (Hemiptera, Diaspididae) in Azerbaijan. *Journal of Entomology and Zoology Studies*, *5*(1), 692–696.
National Plant Protection Organisation (NPPO) of Cyprus. (2024). Re: EFSA request of information on pest status. 12 November 2024. E-mail.
Nazari, P., Poorjavad, N., & Izadi, H. (2020). Simultaneous occurrence of diapause and cold hardiness in overwintering eggs of the apple oystershell scale, *Lepidosaphes malicola* Borchsenius (Hem.: Diaspididae). *Zoological Studies*, *59*, 1–7.
Özgen, İ., & Karsavuran, Y. (2005). Antepfıstığı ağaçlarında zararlı *Lepidosaphes pistaciae* (Archangelskaya) (Homoptera: Diaspididae)'nin doğal düşmanlarının saptanması üzerinde araştırmalar. *Turkish Journal of Entomology*, *29*(4), 309–316.
Özgen, I., & Karsavuran, Y. (2011). The population fluctuations of *Lepidosaphes pistaciae* (Archangeskaya)(Homotrera: Diaspididae) pest of pistachio trees in Siirt provibce of Turkey. *Munis Entomology and Zoology*, *6*, 977–982.
Plant Pests of the Middle East. (online). Diaspididae. https://www.agri.huji.ac.il/mepests/entry/Diaspididae/
Rouhani, M., Vahedi, H. A., & Marefat, A. (2018). Genetic variation of yellow pistachio hard scale, *Lepidosaphes pistaciae* Archangelskaya (hem.: Diaspididae) populations in Kerman province, Iran revealed by ISSR markers. *Cellular and Molecular Biology*, *64*(11), 20–24.
Rubel, F., Brugger, K., Haslinger, K. & Auer, I. (2017). The climate of the European Alps: Shift of very high resolution Köppen-Geiger climate zones 1800–2100. *Meteorologische Zeitschrift*, *26*(2), 115–125.
Sayers, E. W., Cavanaugh, M., Clark, K., Pruitt, K. D., Sherry, S. T., Yankie, L., & Karsch-Mizrachi, I. (2024). GenBank 2024 update. *Nucleic Acids Research*, *52*(D1), D134–D137. https://doi.org/10.1093/nar/gkad903

Şişman, S., & Ülgentürk, S. (2010). Scale insects species (Hemiptera: Coccoidea) in the Turkish Republic of Northern Cyprus. *Turkish Journal of Zoology*, *34*(2), 219–224.

Taghizadeh, F., & Safavi, M. (1960). *Pistachio pests of Iran and means of control*. Plant Protection Research Department.

Toy, S. J., & Newfield, M. J. (2010). The accidental introduction of invasive animals as hitchhikers through inanimate pathways: A New Zealand perspective. *Revue Scientifique et Technique (International Office of Epizootics)*, *29*(1), 123–133.

TRACES-NT. (online). TRADE Control and Expert System. https://webgate.ec.europa.eu/tracesnt

Ülgentürk, S., Ercan, C., Yaşar, B., & Kaydan, M. B. (2022). Checklist of Turkish Coccoidea (Hemiptera: Sternorryncha) species. *Trakya University Journal of Natural Sciences*, *23*(Special Issue: Biodiversity of Insect), 113–129.

Watson, G. M. (2002). *Arthropods of economic importance: Diaspididae of the world 2.0*. Naturalis Biodiversity Center. *Lepidosaphes pistaciae*. https://diaspididae.linnaeus.naturalis.nl/linnaeus_ng/app/views/introduction/topic.php?id=3377&epi=155

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APPENDIX A

Lepidosaphes pistaciae host plants/species affected

Source: literature

Host status	Host name	Plant family	Common name	Reference[A]
Cultivated hosts	*Alianthus*	Orchidaceae	–	Hosseininaveh et al. (2016)
	Ceanothus	Rhamnaceae	–	Hosseininaveh et al. (2016)
	Ceratonia siliqua	Fabaceae	Locust bean	Hosseininaveh et al. (2016)
	Ficus carica	Moraceae	Fig	Şişman and Ülgentürk (2010)
	Malus domestica (cited as M. pumila in the paper)	Rosaceae	Apple	Hosseininaveh et al. (2016)
	Malus sylvestris	Rosaceae	Wild apple	Özgen and Karsavuran (2005)
	Pistacia atlantica	Anacardiaceae	Mount Atlas mastic tree	Hosseininaveh et al. (2016)
	Pistacia chinensis subsp. integerrima	Anacardiaceae	–	Hosseininaveh et al. (2016)
	Pistacia khinjuk	Anacardiaceae	–	Hosseininaveh et al. (2016)
	Pistacia lentiscus	Anacardiaceae	Mastic tree	Özgen and Karsavuran (2005)
	Pistacia terebinthus	Anacardiaceae	Cyprus turpentine	Özgen and Karsavuran (2005)
	Pistacia vera	Anacardiaceae	Pistachio	Hosseininaveh et al. (2016)
	Populus	Salicaceae	–	Hosseininaveh et al. (2016)
	Prunus armeniaca	Rosaceae	Apricot	Hosseininaveh et al. (2016)
	Pyrus	Rosaceae	–	Hosseininaveh et al. (2016)
	Rhododendron	Ericaceae	–	Hosseininaveh et al. (2016)
	Rosa	Rosaceae	–	Hosseininaveh et al. (2016)
	Salix	Salicaceae	–	Hosseininaveh et al. (2016)
	Sassafras	Lauraceae	–	Hosseininaveh et al. (2016)
	Sorbus	Rosaceae	–	Hosseininaveh et al. (2016)
	Stillingia	Euphorbiaceae	–	Hosseininaveh et al. (2016)
	Vitis vinifera	Vitaceae	Grapevine	Özgen and Karsavuran (2005)

APPENDIX B

Distribution of *Lepidosaphes pistaciae*

Distribution records based on literature.

Region	Country	Sub-national (e.g. State)	Status	References
EU	Cyprus	Famagusta	Present, no details	Şişman and Ülgentürk (2010)
		Kyrenia	Present, no details	Şişman and Ülgentürk (2010)
	Greece		Present, no details	Katsoyannos and Stathas (1993)
Asia	Afghanistan		Present, no details	Hosseininaveh et al. (2016)
	Armenia		Present, no details	Hosseininaveh et al. (2016)
	Azerbaijan		Present, no details	Mustafayeva (2016)
	Georgia	Kakheti	Present, no details	Batsankalashvili et al. (2017)
		Tbilisi	Present, no details	Batsankalashvili et al. (2017)
	Iran		Present, widespread	Moghadam and Tavakoli (2010)
		Esfahan	Present, no details	Masjedian and Seyedoleslami (2003)
		Fars	Present, no details	Kiriukhin (1946)
		Ghazvin	Present, no details	Jamshidi et al. (2021)
		Gilan	Present, no details	Jamshidi et al. (2021)
		Ilam	Present, no details	Moghaddam (2013)
		Kerman	Present, no details	Hosseininaveh et al. (2016)
		Kermanshah	Present, no details	Moghadam and Tavakoli (2010)
		Razavi Khorasan	Present, no details	Moghaddam (2013)
		Kohgiluyeh and Boyer-Ahmad	Present, no details	Moghaddam (2013)
		Kordestan	Present, no details	Moghaddam (2013)
		Lorestan	Present, no details	Jamshidi et al. (2021)
		Sistan and Balouchestan	Present, no details	Moghaddam (2013)
		Tehran	Present, no details	Jamshidi et al. (2021)
		West Azarbayejan	Present, no details	Moghaddam (2013)
		Yazd	Present, no details	Jamshidi et al. (2021)
	Iraq	Dahuk	Present, no details	Bodenheimer (1943)
		Erbil	Present, no details	Bodenheimer (1943)
	Kazakhstan		Present, no details	Hosseininaveh et al. (2016)
	Kyrgyzstan	Jalal-abad	Present, no details	Kozimjon et al. (2021)
	Pakistan		Present, no details	Hosseininaveh et al. (2016)
	Syria		Present, no details	Hosseininaveh et al. (2016)
	Tajikistan		Present, no details	Hosseininaveh et al. (2016)
	Türkiye		Present, widespread	Özgen and Karsavuran (2011)
		Adana	Present, no details	Özgen and Karsavuran (2011)
		Adıyaman	Present, no details	Ülgentürk et al. (2022)
		Afyon	Present, no details	Ülgentürk et al. (2022)
		Ağrı	Present, no details	Ülgentürk et al. (2022)
		Amasya	Present, no details	Ülgentürk et al. (2022)
		Antalya	Present, no details	Özgen and Karsavuran (2011)
		Ardahan	Present, no details	Ülgentürk et al. (2022)
		Artvin	Present, no details	Ülgentürk et al. (2022)
		Aydin	Present, no details	Özgen and Karsavuran (2011)
		Balikesir	Present, no details	Özgen and Karsavuran (2011)
		Bartin	Present, no details	Ülgentürk et al. (2022)
		Batman	Present, no details	Özgen and Karsavuran (2005)
		Bayburt	Present, no details	Ülgentürk et al. (2022)

(Continues)

(Continued)

Region	Country	Sub-national (e.g. State)	Status	References
		Bingöl	Present, no details	Ülgentürk et al. (2022)
		Bitlis	Present, no details	Ülgentürk et al. (2022)
		Bolu	Present, no details	Özgen and Karsavuran (2011)
		Canakkale	Present, no details	Özgen and Karsavuran (2011)
		Corum	Present, no details	Ülgentürk et al. (2022)
		Denizli	Present, no details	Ülgentürk et al. (2022)
		Diyarbakır	Present, no details	Ülgentürk et al. (2022)
		Elazığ	Present, no details	Ülgentürk et al. (2022)
		Erzincan	Present, no details	Ülgentürk et al. (2022)
		Erzurum	Present, no details	Ülgentürk et al. (2022)
		Gaziantep	Present, no details	Özgen and Karsavuran (2011)
		Giresun	Present, no details	Ülgentürk et al. (2022)
		Gumushane	Present, no details	Ülgentürk et al. (2022)
		Hakkari	Present, no details	Ülgentürk et al. (2022)
		Iğdır	Present, no details	Ülgentürk et al. (2022)
		Izmir	Present, no details	Özgen and Karsavuran (2011)
		Karabuk	Present, no details	Ülgentürk et al. (2022)
		Kars	Present, no details	Ülgentürk et al. (2022)
		Kastamonu	Present, no details	Ülgentürk et al. (2022)
		Kilis	Present, no details	Ülgentürk et al. (2022)
		Kutahya	Present, no details	Ülgentürk et al. (2022)
		Malatya	Present, no details	Ülgentürk et al. (2022)
		Manisa	Present, no details	Özgen and Karsavuran (2011)
		Mardin	Present, no details	Özgen and Karsavuran (2011)
		Mugla	Present, no details	Özgen and Karsavuran (2011)
		Muş	Present, no details	Ülgentürk et al. (2022)
		Ordu	Present, no details	Ülgentürk et al. (2022)
		Rize	Present, no details	Ülgentürk et al. (2022)
		Sanliurfa	Present, no details	Özgen and Karsavuran (2005)
		Sansun	Present, no details	Ülgentürk et al. (2022)
		Saricam	Present, no details	Elekcioğlu and Kaydan (2021)
		Siirt	Present, no details	Özgen and Karsavuran (2011)
		Sinop	Present, no details	Ülgentürk et al. (2022)
		Şırnak	Present, no details	Ülgentürk et al. (2022)
		Tokat	Present, no details	Ülgentürk et al. (2022)
		Trabzon	Present, no details	Ülgentürk et al. (2022)
		Tunceli	Present, no details	Ülgentürk et al. (2022)
		Usak	Present, no details	Ülgentürk et al. (2022)
		Van	Present, no details	Ülgentürk et al. (2022)
		Zonguldak	Present, no details	Özgen and Karsavuran (2011)
	Turkmenistan		Present, no details	Jamshidi et al. (2021)
	Uzbekistan	Bulakbashi	Present, no details	Kozimjon et al. (2021)

APPENDIX C

EU cultivation/harvested/production area of *Lepidosaphes pistaciae* hosts (in 1000 ha)

C.1 EU CULTIVATION/HARVESTED/PRODUCTION AREA OF APPLES (IN 1000 HA) (SOURCE: EUROSTAT ACCESSED ON 12 AUGUST)

Apples	2018	2019	2020	2021	2022
EU	506.27	491.08	489.19	492.56	477.98
Belgium	5.99	5.79	5.48	5.35	5.23
Bulgaria	3.98	4.14	3.56	3.78	3.72
Czechia	7.25	7.32	7.19	7.11	7.01
Denmark	1.42	1.39	1.38	1.40	1.41
Germany	33.98	33.98	33.98	33.98	33.11
Estonia	0.60	0.57	0.62	0.73	0.71
Ireland	0.71	0.71	0.71	0.71	0.71
Greece	10.35	9.82	14.38	10.28	10.65
Spain	29.93	29.64	29.49	29.45	29.25
France	50.54	50.37	54.71	54.21	54.02
Croatia	4.73	4.95	4.36	4.39	3.65
Italy	57.44	55.00	54.91	54.47	53.73
Cyprus	0.37	0.37	0.41	0.41	0.40
Latvia	3.20	3.44	3.50	3.20	3.06
Lithuania	10.13	10.18	10.50	10.18	9.88
Luxembourg	0.27	0.27	0.08	0.10	0.10
Hungary	31.84	30.97	25.97	25.02	23.82
Netherlands	6.60	6.42	6.20	5.97	5.90
Austria	6.74	6.59	6.43	6.35	6.30
Poland	166.15	155.62	152.60	161.90	151.90
Portugal	13.61	14.31	14.31	13.92	13.73
Romania	53.94	52.74	52.34	53.82	54.07
Slovenia	2.33	2.27	2.16	2.09	2.03
Slovakia	2.14	2.06	1.80	1.64	1.54

C.2 EU CULTIVATION/HARVESTED/PRODUCTION AREA OF APRICOTS, 2018–2022 (IN 1000 HA) (SOURCE: EUROSTAT ACCESSED ON 12 AUGUST)

Apricots	2018	2019	2020	2021	2022
EU	72.57	73.22	76.13	73.48	72.05
Bulgaria	2.55	2.91	1.84	3.06	3.05
Czechia	1.15	1.15	1.17	1.12	1.11
Germany	0.23	0.23	0.23	0.23	0.29
Greece	7.94	8.35	12.24	8.96	9.36
Spain	20.57	20.24	19.78	19.44	18.43
France	12.27	12.28	12.08	11.88	11.36
Croatia	0.27	0.26	0.29	0.31	0.31
Italy	17.81	17.91	17.81	17.74	17.45
Cyprus	0.18	0.18	0.20	0.21	0.19
Hungary	5.04	4.99	5.94	6.05	5.82
Austria	0.83	0.82	0.83	0.86	0.86
Poland	0.97	1.06	0.90	0.90	1.00

(Continues)

(Continued)

Apricots	2018	2019	2020	2021	2022
Portugal	0.56	0.54	0.52	0.53	0.60
Romania	1.97	2.04	2.03	1.92	1.96
Slovenia	0.08	0.08	0.09	0.09	0.09
Slovakia	0.16	0.18	0.20	0.19	0.19

C.3 EU CULTIVATION/HARVESTED/PRODUCTION AREA OF FIGS, 2018–2022 (IN 1000 HA) (SOURCE: EUROSTAT ACCESSED ON 12 AUGUST)

Figs	2018	2019	2020	2021	2022
EU	24.99	25.59	27.63	25.79	26.29
Bulgaria	0.00	0.01	0.03	0.04	0.03
Greece	3.77	3.99	4.40	1.15	1.43
Spain	13.98	14.60	15.72	17.16	18.10
France	0.44	0.44	0.84	0.84	0.84
Croatia	0.27	0.42	0.57	0.57	0.56
Italy	2.23	2.15	2.06	2.07	1.49
Cyprus	0.14	0.16	0.19	0.19	0.19
Portugal	4.13	3.81	3.81	3.77	3.62
Slovenia	0.01	0.02	0.02	0.02	0.02

C.4 EU CULTIVATION/HARVESTED/PRODUCTION AREA OF GRAPES, 2018–2022 (IN 1000 HA) (SOURCE: EUROSTAT ACCESSED ON 12 AUGUST)

Grapes	2018	2019	2020	2021	2022
EU	3135.50	3155.20	3146.24	3120.22	3110.06
Belgium	0.30	0.38	0.49	0.56	0.68
Bulgaria	34.11	30.05	28.74	28.53	28.47
Czechia	15.94	16.08	16.14	16.36	16.42
Estonia	0.00	0.00	0.00	0.00	0.00
Greece	100.34	101.85	104.21	89.84	84.71
Spain	939.92	936.89	931.63	929.39	922.92
France	750.62	755.47	759.59	757.83	757.55
Croatia	20.51	19.82	21.45	21.21	20.60
Italy	675.82	697.91	703.90	702.67	709.89
Cyprus	6.67	6.67	6.18	6.16	6.10
Luxembourg	1.25	1.24	1.24	1.23	1.22
Hungary	66.06	64.92	59.63	59.07	58.01
Malta	0.42	0.42	0.45	0.46	0.46
Netherlands	0.17	0.16	0.17	0.19	0.21
Austria	46.50	46.36	46.16	42.84	42.84
Poland	0.73	0.74	1.00	1.00	1.10
Portugal	179.25	175.65	175.67	175.62	175.79
Romania	172.80	176.34	165.60	163.61	159.74
Slovenia	15.65	15.57	15.29	14.90	14.42
Slovakia	8.01	7.92	7.73	7.75	7.79

APPENDIX D

Import data

TABLE D.1 Fresh apples (CN code: 1080810) imported in 100 kg into the EU from regions where *Lepidosaphes pistaciae* is known to occur (Source: Eurostat accessed on 12 August 2024).

Country/year	2018	2019	2020	2021	2022
Armenia	5.54	2.00	–	1.00	–
Uzbekistan	0.26	–	38.40	–	–
Georgia	–	–	187.20	–	0.07
Pakistan	–	1.95	0.08	–	–
Russia	382.20	390.00	–	–	–
Kyrgyzstan	395.20	–	–	–	–
Iran	2945.28	0.38	676.65	–	–
Türkiye	17,594.86	2311.21	19,023.31	9623.89	4148.19
Syria	585.00	–	–	–	–
Total	21,908.34	2705.54	19,925.64	9624.89	4148.26

TABLE D.2 Fresh apricots (CN code: 18091000) imported in 100 kg into the EU from regions where *Lepidosaphes pistaciae* is known to occur (Source: Eurostat accessed on 12 August 2024).

Country/year	2018	2019	2020	2021	2022
Armenia	28.33	29.80	15.67	208.00	33.35
Uzbekistan	110.60	–	637.47	0.31	0.01
Georgia	–	–	–	0.01	–
Pakistan	–	0.75	–	0.26	2.10
Russia	–	1.68	–	–	–
Kyrgyzstan	–	-	197.32	–	–
Iran	1.65	–	–	–	–
Türkiye	68,502.17	48,880.18	10,4474.44	70,924.16	69,310.15
Syria	–	–	0.70	–	–
Total	68,642.75	48,912.41	105,325.60	71,132.74	69,345.61

TABLE D.3 Fresh figs (CN code: 08042010) imported in 100 kg into the EU from regions where *Lepidosaphes pistaciae* is known to occur (Source: Eurostat accessed on 12 August 2024).

Country/year	2018	2019	2020	2021	2022
Georgia	–		0.06	–	–
Iran	0.07	–	4.95	–	–
Türkiye	114,596.40	131,193.76	147,002.04	140,278.06	145,396.49
Syria	–	–	–	168.15	–
Total	114,596.47	131,193.76	147,007.05	140,446.21	145,396.49

TABLE D.4 Grapes, fresh or dried (CN code: 080610) imported in 100 kg into the EU from regions where *Lepidosaphes pistaciae* is known to occur (Source: Eurostat accessed on 12 August 2024).

Country/year	2018	2019	2020	2021	2022
Armenia	544.00	0.12	–	0.12	0.06
Tajikistan	20.00	–	10.02	10.45	6.60
Uzbekistan	74951.18	113,826.20	69,333.46	72,907.11	92,004.93
Iraq	12.20	7.82	49.96	261.74	3.74
Kazakhstan	–	–	480.00	–	–
Georgia	–	373.55	15.24	0.19	0.40
Pakistan	14,655.68	13,385.60	11092.98	8920.51	4084.68

(Continues)

TABLE D.4 (Continued)

Country/year	2018	2019	2020	2021	2022
Russia	1.00	0.71	16.90	7.85	25.88
Kyrgyzstan	0.26	–	5.00	9.90	–
Iran	101,488.05	165,329.68	201,689.92	298,066.29	114,886.10
Türkiye	1,650,673.26	1,505,665.12	1,410,795.14	1,507,167.06	1,571,984.29
Syria	2.10	2.73	2.73	4.20	8.63
Total	1,842,347.73	1,798,591.53	1,693,491.35	1,887,355.42	1,783,005.31

APPENDIX E

PRISMA 2009 Flow Diagram

Name of the Pest: *Lepidosaphes pistaciae*.
Date of the search: 21/5/2024.
Approved Literature Search String: ("Lepidosaphes pistacicola" OR "Lepidosaphes pistaciae" OR "Pistaciaspis pistaciae" OR "Pistaciaspis pistacicola" OR "Mytilococcus pistaciae" OR "pistachio oystershell scale" OR "yellow pistachio scale" OR "yellow pistachio hard scale" OR "Pistazienkommaschildlaus" OR "Pistazienschildlaus" OR "щитовка фисташковая" OR "antep fistigi kabuklu biti").