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SCIENTIFIC OPINION

Pest categorisation of *Cenopalpus irani*

EFSA Panel on Plant Health (PLH) | Claude Bragard | Paula Baptista | Elisavet Chatzivassiliou | Francesco Di Serio | Paolo Gonthier | Josep Anton Jaques Miret | Annemarie Fejer Justesen | Christer Sven Magnusson | Panagiotis Milonas | Juan A. Navas-Cortes | Stephen Parnell | Roel Potting | Philippe Lucien Reignault | Emilio Stefani | Hans-Hermann Thulke | Wopke Van der Werf | Antonio Vicent Civera | Jonathan Yuen | Lucia Zappalà | Jean-Claude Grégoire | Chris Malumphy | Vasiliki Evangelou | Virag Kertesz | Dimitrios Papachristos | Oresteia Sfyra | Alan MacLeod

Correspondence: plants@efsa.europa.eu

Abstract

The EFSA Panel on Plant Health performed a pest categorisation of *Cenopalpus irani* (Trombidiformes: Tenuipalpidae), known as the Iranian false spider mite, following the commodity risk assessment of *Malus domestica* plants from Türkiye, in which *C. irani* was identified as a pest of possible concern for the territory of the European Union (EU). The pest is only known to be present in Iran and Türkiye and has not been reported from the EU. The mite primarily feeds on Rosaceae plants but is considered polyphagous. Important crops of the EU that are hosts of *C. irani* include apples (*Malus domestica*), pears (*Pyrus communis*) and figs (*Ficus carica*). Plants for planting and fruits provide potential pathways for entry into the EU. Host availability and climate suitability in southern EU countries would most probably allow this species to successfully establish and spread. This mite is not listed in Annex II of Commission Implementing Regulation (EU) 2019/2072. Phytosanitary measures are available to reduce the likelihood of entry and spread of this species into the EU. The mite *C. irani* satisfies the criteria that are within the remit of EFSA to assess for it to be regarded as a potential Union quarantine pest, although there is a key uncertainty over the likelihood and magnitude of impact.

KEYWORDS

apple trees, flat mite, Iranian false spider mite, pest risk, plant health, plant pest, quarantine, Tenuipalpidae

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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

Cenopalpus irani Dosse is one of the 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 (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 assessments of *Malus domestica* plants from Türkiye (EFSA PLH Panel, 2022), in which *C. irani* was identified as a relevant non-regulated EU pest of possible concern, which could potentially enter the EU on apple plants.

2 | DATA AND METHODOLOGIES

2.1 | Data

2.1.1 | Literature search

A literature search on *C. irani* 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.

2.1.2 | Database search

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 *C. irani w*hich 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 *C. irani* 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) 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, 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 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

(Continues)

TABLE 1 (Continued)

Criterion of pest categorisation	Criterion in regulation (EU) 2016/2031 regarding union quarantine pest (article 3)
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 established and *Cenopalpus irani* Dosse is the accepted name.

The Iranian false spider mite, *Cenopalpus irani* Dosse is a mite of the family Tenuipalpidae (Arachnida: Acariformes: Trombidiformes: Prostigmata: Tetranychoidea), which was first described by Dosse in 1971 from apple leaves collected from Karaj and Shiraz regions in Iran (Dosse, 1971). Smith-Meyer assigned the species *irani* to the genus *Brevipalpus* in 1979 (Meyer, 1979). Khanjani et al. (2012) re-described the adult female and illustrated again its individuals.

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

3.1.2 | Biology of the pest

The phytophagous mite *C. irani* completes its life cycle in five stages, egg, larva, protonymph, deutonymph and adult. The intermediate stages are nymphochrysalis (larva to protonymph), deutochrysalis (protonymph to deutonymph) and teliochrysalis (deutonymph to adult), in which they do not feed.

Under laboratory conditions, Bazgir, Jafari, and Shakarami (2015) found that the total development time for *C. irani* females decreased with increasing temperature. From 20°C to 32°C the development time reduced from 47.63 to 19.74 days. Females laid an average of 25.78, 34.60 and 29.50 eggs at 20, 30 and 32°C, respectively. The longest duration of the female life span occurred at 20°C and it was 111.06 days, in contrast to 52.47 days at 32°C. The mean generation time decreased from 62.41 to 28.31 days with increasing temperature from 20°C to 32°C. The lowest temperature threshold for different developmental stages of *C. irani* varied from 9°C to 14°C.

Bazgir, Jafari, Shakarami, and Bahirae (2015) reported, under laboratory conditions, a survival rate for *C. irani* immature stages of 30.00, 43.75, 66.25, 85.00, 65.00 and 51.25% at 15, 20, 25, 30, 32 and 33.5°C, respectively. The highest gross fecundity rate was 34.60 eggs/female at 30°C and the lowest was 18.50 eggs/female at 15°C. According to Bazgir, Jafari, Shakarami, and Bahirae (2015), the optimum temperature for population growth of *C. irani* on apple leaves under laboratory conditions was 30°C.

The mite completes three generations per year in apple orchards in Iran (Darbemamieh et al., 2009; Rashki et al., 2004). Hibernating females are found on branches during winter, beginning by mid-October. At the end of April, mated females of the overwintering population appear (Rashki et al., 2004). The first generation starts at the end of April, and the second one at the end of June. Finally, the third generation starts at the end of August. The female population reached its peak at the end of October, during the third generation just before going into overwintering (Rashki et al., 2004). In another study, Darbemamieh et al. (2009) observed the first individuals of *C. irani* by the end of May and their population density to peak in mid-August. In Iran, the population density in different studies ranged from 0.06 to 28.88 individuals/leaf (Jafari et al., 2014).

[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).

3.1.3 | Host range/species affected

C. irani is reported from 25 different plant species belonging to 11 families, but plants in the Rosaceae family are the most common (Bazgir, Jafari, & Shakarami, 2015; Khanjani et al., 2012). Apples, figs and pears are considered hosts. Other plants on which *C. irani* has been found are of uncertain host status. On apple trees, which are the main host, *C. irani* creates large populations. For other plant species, it is uncertain whether they are true hosts (supporting complete development from egg to adult) or have been found accidentally due to random dispersal. The full list of plant species on which the pest has been reported is presented in Appendix A.

Apples, pears and figs are important host plants in the EU. There are other important crops in the EU that are potential host plants of *C. irani* such as quince (*Cydonia oblonga*), stone fruits (*Prunus* spp.), grapes (*Vitis vinifera*), olives (*Olea europaea*), pistachios (*Pistacia mutica*, *P. vera*), pomegranate (*Punica granatum*), walnuts (*Juglans regia*) and ornamental plants (*Chaenomeles* sp., *Pyracantha coccinea*) (Arbabi & Baradaran, 2001; Beyzavi et al., 2013; Çobanoglu et al., 2019; Khanjani et al., 2010, 2012; Mehrnejad & Ueckermann, 2001, 2002).

3.1.4 | Intraspecific diversity

No intraspecific diversity 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 detection and morphological identification of *C. irani*.

Detection

The adults and larvae are bright red and can appear conspicuous on the host plant, despite their small size. Careful examination of leaves using a stereoscopic microscope could be used for the detection of *C. irani*, usually after removing mites with a fine paint brush on a glass plate. Berlese funnels are also used, in order to extract the mites from the plant material collected (Çobanoglu et al., 2019).

Symptoms

The feeding of both adult and immature mites may result in leaf discoloration, plant defoliation and low plant vigour (Bazgir et al., 2018; Jafari et al., 2014; Jafari & Bazgir, 2015).

Description

The adults, deutonymphs, protonymphs and larvae are flat, oval-shaped and red, with oval idiosoma. The female body length varies between 341–370 μm and its width between 162–177 μm (Çobanoglu et al., 2019). The male body length has been measured between 276–307 μm and its width, 124–135 μm. Deutonymphes are about the same size as males, while individuals belonging to younger life stages are smaller (Khanjani et al., 2012).

Identification

The identification of *C. irani* requires microscopic examination of slide-mounted individuals (male and female adults and deutonymphs), verification of the presence/absence of key morphological characteristics and measurements for the width (at the level of setae c3) and length (from the base) of the body, the length of idiosoma (from the base of gnathosoma to the posterior margin of opisthosoma) and the length of each leg (from the tip of empodium to the posterior margin of trochanter). *C. irani* specimens are identified based on keys published by Meyer (1979), Rahmani et al. (2008), Khanjani et al. (2012), and Çobanoglu et al. (2019). A detailed morphological description and illustration of the adult female and male, the deutonymph and the larvae can be found in Khanjani et al. (2012) and Çobanoglu et al. (2019).

Molecular diagnostic protocols for species identification or genome sequences are not available for this mite.

3.2 | Pest distribution

3.2.1 | Pest distribution outside the EU

C. irani occurs in the Middle East, specifically in Iran and Türkiye (Figure 1; Çobanoglu et al., 2019; Khanjani et al., 2012). In these two countries, details on the presence of *C. irani* in sub-national units are provided in Appendix B.

FIGURE 1 Distribution of *Cenopalpus irani* (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***.**

No, *C. irani* is not known to be present in the EU territory.

3.3 | Regulatory status

3.3.1 | Commission Implementing Regulation 2019/2072

C. irani 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 | Hosts or species affected that are prohibited from entering the Union from third countries

TABLE 2 List of plants, plant products and other objects on which *Cenopalpus irani* is reported and 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**
1.	Plants of […] *Pinus* L., […] other than fruit and seeds	ex 0602 20 20 ex 0602 20 80 ex 0602 90 41 ex 0602 90 45 ex 0602 90 46 ex 0602 90 47 ex 0602 90 50 ex 0602 90 70 ex 0602 90 99 ex 0604 20 20 ex 0604 20 40	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
3.	Plants of *Populus* L., with leaves, other than fruit and seeds	ex 0602 10 90 ex 0602 20 20 ex 0602 20 80 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 99 ex 0604 20 90 ex 1404 90 00	Canada, Mexico, United States
7.	Isolated bark of *Populus* L.	ex 1404 90 00 ex 4401 40 90	The Americas
8.	Plants for planting of *Chaenomeles* Ldl., […] *Cydonia* Mill., *Malus* Mill., *Prunus* L., P*yrus* 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 *Cydonia* Mill., *Malus* Mill., *Prunus* L. and *Pyrus* L. and their hybrids, […] 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 and United States other than Hawaii
10	Plants of *Vitis* L., other than fruits	0602 10 10 0602 20 10 ex 0604 20 90 ex 1404 90 00	Third countries other than Switzerland

Plants for planting of *Ficus carica* L., *Juglans* L., *Malus* Mill., *Populus* L. and *Prunus* L., on which *C. irani* has been reported (Appendix A), are considered High Risk Plants for the EU and their import is prohibited pending risk assessment (Commission Implementing Regulation (EU) 2018/2019). There is a derogation for certain *Malus domestica* grafted plants, rootstocks, bud wood and scions for planting from Türkiye (further details describing conditions for import are in Commission Implementing Regulation (EU) 2024/1162).

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 could enter the EU territory. Possible pathways of entry are plants for planting and fruits.

Comment on plants for planting as a pathway.

Plants for planting are one of the main pathways for *C. irani* to enter the EU although some of the host plants from some third countries are prohibited (Table 2).

Potential pathways for *C. irani* to enter the EU territory are presented in Table 3.

TABLE 3 Potential pathways for *Cenopalpus irani* into the EU.

Pathways	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 *C. irani* and are prohibited from being imported from third countries (Regulation 2019/2072, Annex VI) are listed in Table 2 A phytosanitary certificate is required for plants for planting from third countries to be imported into the EU (Regulation 2019/2072, Annex XI, Part A) Some hosts are considered high risk plants (EU 2018/2019) for the EU and their import is prohibited subject to risk assessment
Fruits	All life stages	A phytosanitary certificate is required for fruits from third countries to be imported into the EU (2019/2072, Annex XI, Part A)

C. irani has been reported on a wide range of plants (listed in Appendix A), and many of them are imported into the EU from areas where the pest occurs. There are some prohibitions on imports of some of the listed species of plants for planting from third countries (Regulation 2019/2072, Annex VI). However, one of the two countries where *C. irani* is present (i.e. Türkiye) is excluded from these prohibitions. There are many other hosts that can be imported to the EU with a phytosanitary certificate.

Fruits of some host plants of *C. irani* (apples, figs, grapes, peaches, etc.) are imported into the EU from areas where the pest occurs. A phytosanitary certificate for fruits that are imported into the EU is required (Regulation 2019/2072, Annex XI, Part A). However, the fruits may carry mites which could remain undetected even after inspection, and this may be a pathway for the entry of the mite. Detailed data of the annual imports of Appendix A-listed plant commodities into the EU from countries where the pest occurs are provided in Appendix C.

Notifications of interceptions of harmful organisms began to be compiled in Europhyt in May 1994 and in TRACES in May 2020. As at 15/04/2024 there were no records of interception of *C. irani* in the Europhyt and TRACES databases (EUROPHYT, online).

3.4.2 | Establishment

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

Yes, there are climate zones in the EU that match those where *C. irani* occurs and hosts occur in these zones that can support establishment.

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). 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*

C. irani is a polyphagous pest feeding on a relatively wide range of crop plants. The main hosts of the pest cultivated in the EU between 2018 and 2022 are shown in Table 4. The main cultivated host plants of the pest which are economically important in the EU are apples, figs, grapes and peaches.

TABLE 4 Crop area of *Cenopalpus irani* hosts in the EU ha (Eurostat accessed on 17/4/2024).

Crop	2018	2019	2020	2021	2022
Grapes	3,135,500	3,155,200	3,146,240	3,120,220	3,110,060
Apples	506,270	491,080	489,190	492,560	477,980
Peaches	214,970	206,870	203,320	194,010	190,070
Figs	24,990	25,590	27,630	25,790	26,290

3.4.2.2 | *Climatic conditions affecting establishment*

C. irani occurs in areas with dry and hot summer and a cool and rainy winter (Mediterranean climate). Figure 2 shows the world distribution of selected Köppen–Geiger climate types (Kottek et al., 2006) that occur in the EU, and which occur in countries where *C. irani* has been reported (BSh, BSk, Csa and Csb). Based on current distribution, establishment is most likely to occur in hot areas of the EU. The Mediterranean countries provide suitable climatic conditions for the establishment of *C. irani*.

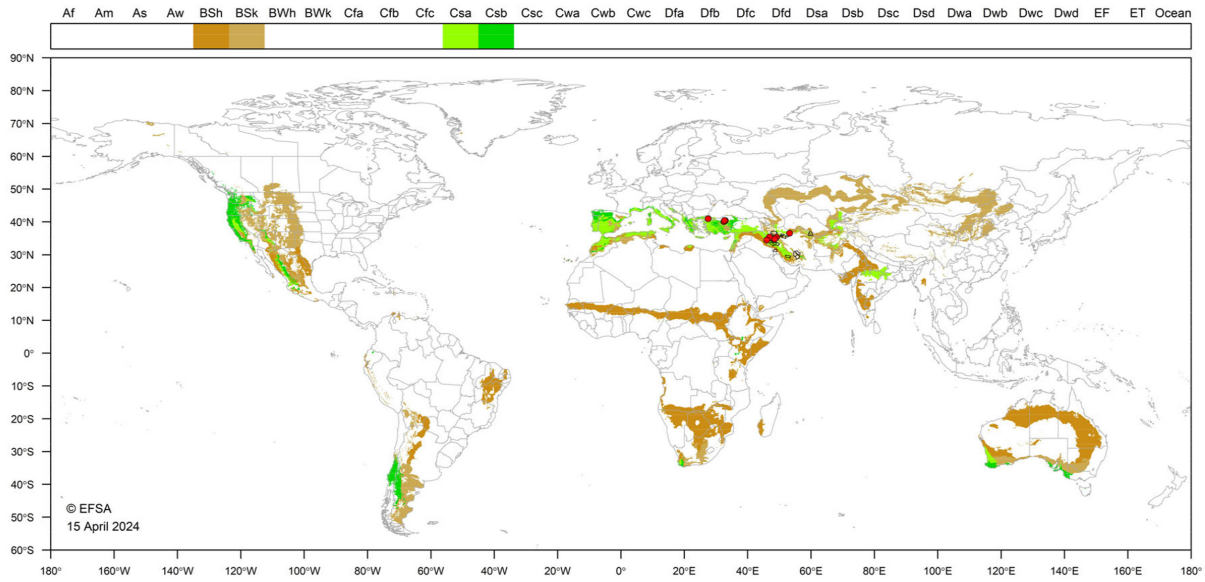

FIGURE 2 World distribution of Köppen–Geiger climate types that occur in the EU and which occur in countries where *Cenopalpus irani* has been reported. Red dots indicate precise locations where the mite has been collected.

3.4.3 | Spread

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

The mite would spread over short distances naturally on air currents or passively via orchard workers tools and clothing for example.

Comment on plants for planting as a mechanism of spread.

The trade of infested plants for planting and fruits are the main pathways of *C. irani* spread within the EU territory.

The pest is able to spread over short distances naturally by air or via clothing, birds or tools, due to the tiny size of all life stages. The adults are more active, though immature stages are able to move, too. For long-distance spread the trade of infested plants for planting and fruits is the main pathway (Fathipour, & Maleknia, 2016).

3.5 | Impacts

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

Yes, if *C. irani* established in the EU, impacts of uncertain magnitude, e.g. in apple orchards, could occur.

C. irani is considered one of the important pests of apple orchards in Iran (Darbemamieh et al., 2009). However, literature describes only in general terms the importance of this pest in apples, and no data on impact could be found (Bazgir, Jafari, & Shakarami, 2015). It is reported to cause significant damage to apple trees, as both adults and immature stages feed on their leaves. This leads to the reduction of photosynthesis, the potential decrease of fruit quality and economic losses. Its density increases during the summer and can cause severe symptoms (Bazgir et al., 2018; Jafari et al., 2014; Jafari & Bazgir, 2015). There are no reports for *C. irani* feeding on fruits or reported direct damage on fruits. Damage on fruit is more likely to be indirect by feeding on leaves and reducing their quality. Occasional outbreaks of this pest have caused serious concerns about their detrimental effects on apples (Bazgir, Jafari, & Shakarami, 2015; Bazgir, Jafari, Shakarami, & Bahirae, 2015; Darbemamieh, 2009; Khanjani et al., 2010).

C. irani occurs in Türkiye and although there have been no reports of it as a serious pest, it was only found there in 2019. Were *C. irani* to establish in the EU, impacts in apple orchards would be expected, although potentially mitigated by natural enemies, such as *Zetzellia mali* (Ewing) and *Amblyseius swirskii* Athias-Henriot which occur in the EU (Viñuela & Jacas, 1998), hence the magnitude of potential impact is uncertain. Of note, a congeneric species, *C. pulcher* (Canestrini and Fanzago), which also occurs in the EU, is known to occur on apples (and many other Rosaceae) as an occasional pest on abandoned trees. There is no strong evidence to suggest that *C. irani* would become a major pest in well-managed apple orchards. Nevertheless, a degree of environmental impact cannot be ruled out.

The uncertainty on the impact is considered as a key uncertainty. There are no quantitative data.

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, although the existing phytosanitary measures identified in Section 3.3.2 do not specifically target *C. irani*, they mitigate the likelihood of its entry into, establishment and spread within the EU (see also Section 3.6.1).

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 5.

TABLE 5 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	Due to the pest's low mobility, sourcing plants from a pest free area or place of production or production site can be easily and efficiently applied	Entry/Spread
Growing plants in isolation	Plants could be grown in pest-proof places such as glass or plastic greenhouses or in places with complete physical isolation. That measure could mitigate the likelihood of entry and spread of *C. irani*	Entry/Spread
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	Spread/Impact

TABLE 5 (Continued)

Control measure/ risk reduction option (blue underline = Zenodo doc, blue = WIP)	RRO summary	Risk element targeted (entry/establishment/ spread/impact)
Biological control and behavioural manipulation	In nature there are many phytoseid and stigmaeid mites that can feed on mites of the genus *Cenopalpus*. *Zetzellia mali* (Ewing) (Trombidiformes: Stigmaeidae), and *Z. pourmirzai* Khanjani and Ueckermann have been reported to be egg predators of *C. irani* (Darbemamieh et al., 2009, 2011) The following predators of the family Phytoseiidae are able to complete their development when feeding on *C. irani*: - *Amblyseius swirskii* Athias-Henriot (Bazgir et al., 2018, 2020a, 2020b), - *Typhlodromus* (*Anthoseius*) *bagdasarjani* Wainstein and Arutunjan (Bazgir et al., 2019, 2020c; Jafari et al., 2014; Jafari & Bazgir, 2015)	Establishment/Spread/Impact
Chemical treatments on crops including reproductive material	Spray of acaricides might kill all stages of mites although they are protected by moving at the hairy bottom leave surface. Bazgir, Jafari, and Shakarami (2015) reports that the control of mites on apple trees in Iran is mainly based on the use of chemical pesticides. The use of chemical control against plant-feeding mites in apple orchards has often resulted in pest outbreaks caused by the relatively higher impact of acaricides on non-target natural enemies (e.g. phytoseiids) than on the target pest	Entry/Establishment/Spread/ Impact
Chemical treatments on consignments or during processing	The chemical compounds that may be applied to plants or to plant products after harvest, during process or packaging operations and storage could mitigate the likelihood of infestation of pests susceptible to chemical treatment	Entry/Spread
Physical treatments on consignments or during processing	Brushing, washing and other mechanical cleaning methods can be used to reduce the likelihood of the presence of the pest in consignments (especially fruit) to be exported/traded	Entry/Spread
Heat and cold treatments	Controlled temperature treatments aimed to kill or inactivate pests without causing any unacceptable prejudice to the treated material itself	Entry/Spread
Controlled atmosphere	Treatment of plants by storage in a modified atmosphere (including modified humidity, O_2, CO_2, temperature, pressure) could mitigate the likelihood of entry and spread of the pest Controlled atmosphere storage can be used in commodities such as fresh and dried fruits, cut flowers and vegetables	Entry/Spread (via commodity)

3.6.1.2 | *Additional supporting measures*

Potential additional supporting measures are listed in Table 6.

TABLE 6 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 Any shipments of fresh plant material from an infested country to another that is not infested should be inspected thoroughly to detect *C. irani*	Entry/Establishment/Spread
Laboratory testing	Examination, other than visual (i.e. microscopic observation of slide-mounted specimens), 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 For inspection, testing and/or surveillance purposes the sample may be taken according to a statistically based or a non-statistical sampling methodology	Entry/Spread

(Continues)

TABLE 6 (Continued)

Supporting measure (blue underline = Zenodo doc, Blue = WIP)	Summary	Risk element targeted (entry/establishment/spread/impact)
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/Spread
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/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	Entry/Spread
Surveillance	Surveillance to guarantee that plants and produce originate from a pest free area could be an option	Spread

3.6.1.3 | *Biological or technical factors limiting the effectiveness of measures*

- *C. irani* has many host plants, making the inspections of all consignments containing hosts from countries where the pest occurs difficult.
- *C. irani* adults, immature stages and eggs are tiny and difficult to detect by visual inspection. The immature stages have pale colours making them difficult to detect.
- Individuals of *C. irani* usually colonise hairy parts in the abaxial side of leaves and are difficult to detect.

3.7 | Uncertainty

The uncertainty on the impact is considered as a key uncertainty due to lack of information and quantitative data on damage.

4 | CONCLUSIONS

C. irani satisfies all the criteria that are within the remit of EFSA to assess for it to be regarded as a potential Union QP. Table 7 provides a summary of the PLH Panel conclusions.

TABLE 7 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 and *Cenopalpus irani* Dosse, is the accepted name	None
Absence/presence of the pest in the EU (Section 3.2)	The pest is not known to be present in the EU territory	None
Pest potential for entry, establishment and spread in the EU (Section 3.4)	*C. irani* is able to enter into, become established, and spread within the EU territory The main pathways are plants for planting and fruits	None
Potential for consequences in the EU (Section 3.5)	If *C. irani* established in the EU, impacts of uncertain magnitude, e.g. in apple orchards, could occur	The uncertainty on the impact is considered as a key uncertainty due to lack of information and quantitative data on the damage

TABLE 7 (Continued)

Criterion of pest categorisation	Panel's conclusions against criterion in regulation (EU) 2016/2031 regarding union quarantine pest	Key uncertainties
Available measures (Section 3.6)	There are measures available to prevent the entry, establishment and spread of *C. irani* within the EU	None
Conclusion (Section 4)	The criteria assessed by EFSA for consideration as a potential quarantine pest are met	None
Aspects of assessment to focus on/ scenarios to address in future if appropriate:	The actual impact of *C. irani* is not known and only reports of it as an important pest exist without quantified yield losses. Further work to identify plants that are true hosts would be helpful	

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
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)

CONFLICT OF INTEREST

If you wish to access the declaration of interests of any expert contributing to an EFSA scientific assessment, please contact interestmanagement@efsa.europa.eu.

REQUESTOR

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PANEL MEMBERS

Claude Bragard, Paula Baptista, Elisavet Chatzivassiliou, Francesco Di Serio, Paolo Gonthier, Josep Anton Jaques Miret, Annemarie Fejer Justesen, Alan MacLeod, Christer Sven Magnusson, Panagiotis Milonas, Juan A. Navas-Cortes, Stephen Parnell, Roel Potting, Philippe L. Reignault, Emilio Stefani, Hans-Hermann Thulke, Wopke Van der Werf, Antonio Vicent Civera, Jonathan Yuen, and Lucia Zappalà.

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APPENDIX A

Cenopalpus irani host plants/species on which it has been found

Apples, figs and pears are considered hosts. The other plants in the table are of uncertain host status, although *C. irani* has been found on them.

Source: Sepasgozarian (1975), Ardabi and Baradaran (2001), Mehrnejad and Ueckermann (2001), Khanjani et al. (2010, 2012), Beyzavi et al. (2013), Raissi Ardali et al. (2014), Çobanoğlu et al. (2019) and Tenuipalpidae Database (Castro et al., 2024).

Habitat	Plant species	Family	Common name	Reference[A]
Cultivated land	*Carpinus betulus*	Betulaceae	Common hornbeam	Raissi Ardali et al. (2014)
	Cydonia oblonga	Rosaceae	Quince	Sepasgozarian (1975)
	Ficus carica	Moraceae	Common fig	Khanjani et al. (2012)
	Juglans regia	Juglandaceae	Common walnut, Persian walnut, English walnut	Beyzavi et al. (2013)
	Malus domestica	Rosaceae	Apple	Khanjani et al. (2012)
	Olea sp.(assumed to be *O. europea*)	Oleaceae	Olive	Khanjani et al. (2013), Kamali et al. (2001)
	Pistacia mutica	Anacardiaceae	Mount Atlas mastic tree, Atlas pistachio, Atlantic pistacio, Atlantic terebinth, Cyprus turpentine tree, Persian turpentine tree	Mehrnejad and Ueckermann (2001)
	Pistacia vera	Anacardiaceae	Pistachio	Mehrnejad and Ueckermann (2001)
	Prunus amygdalus	Rosaceae	Almond	Çobanoglu et al. (2019)
	Prunus armeniaca	Rosaceae	Peach	Çobanoglu et al. (2019)
	Prunus avium	Rosaceae	Wild cherry, sweet cherry	Çobanoglu et al. (2019)
	Prunus cerasus	Rosaceae	Cherry	Khanjani et al. (2012)
	Prunus domestica	Rosaceae	Plum	Khanjani et al. (2012)
	Punica granatum	Lythraceae	Pomegranate	Khanjani et al. (2010)
	Pyrus communis	Rosaceae	European pear, common pear	Khanjani et al. (2012)
	Pyrus persica	Rosaceae	–	Khanjani et al. (2012)
	Vitis vinifera	Vitaceae	Grapevine	Khanjani et al. (2012)
Other	*Carpinus betulus*	Betulaceae	Common hornbeam	Beyzavi et al. (2013)
	Chaenomeles sp.	Rosaceae	Flowering quince	Beyzavi et al. (2013)
	Pinus eldarica	Pinaceae	Eldar pine, Mondel pine	Arbabi and Baradaran (2001)
	Pinus nigra	Pinaceae	European black pine tree	Beyzavi et al. (2013)
	Platanus orientalis	Platanaceae	Platanus, plain tree	Beyzavi et al. (2013)
	Populus alba	Salicaceae	White poplar	Khanjani et al. (2012)
	Pyracantha coccinea	Rosaceae	Scarlet firethorn, red firethorn, pyracantha	Çobanoglu et al. (2019)

APPENDIX B

Distribution of *Cenopalpus irani*

Distribution records of *Cenopalpus irani* based on Dosse (1971), Kamali (1989), Khanjani et al. (2012), Mehrnejad and Ueckermann (2001), Darbemamieh et al. (2009), Rahmani et al. (2011), Khanjani et al. (2012), Shakhsi et al. (2012), Jafari et al. (2014), Raissi Ardali et al. (2014), and Çobanoglu et al. (2019).

Region	Country	Sub-national (e.g. state)	Status	Reference
Asia	Iran	Ahwaz	Present, no details	Kamali (1989)
		Alborz	Present, no details	Dosse (1971)
		Fars	Present, no details	Mehrnejad and Ueckermann (2001)
		Hamedan	Present, no details	Khanjani et al. (2012)
		Karaj	Present, no details	Dosse (1971)
		Kerman	Present, no details	Mehrnejad and Ueckermann (2001)
		Kermanshah	Present, no details	Darbemamieh et al. (2009)
		Khuzestan	Present, no details	Kamali (1989)
		Khorramabad	Present, no details	Jafari et al. (2014)
		Kurdistan	Present, no details	Khanjani et al. (2012)
		Lorestan	Present, no details	Jafari et al. (2014)
		Mashhad	Present, no details	Shakhsi et al. (2012)
		Mazandaran	Present, no details	Raissi Ardali et al. (2014)
		Rafsanjan	Present, no details	Mehrnejad and Ueckermann (2001)
		Razavi Khorasan	Present, no details	Shakhsi et al. (2012)
		Shahrbabak	Present, no details	Mehrnejad and Ueckermann (2001)
		Shiraz	Present, no details	Dosse (1971)
		Sirjan	Present, no details	Mehrnejad and Ueckermann (2001)
		Tehran	Present, no details	Dosse (1971)
		Zanjan	Present, no details	Rahmani et al. (2008)
	Türkiye	Ayaş	Present, no details	Çobanoglu et al. (2019)
		Çubuk	Present, no details	Çobanoglu et al. (2019)
		Kızılcahamam	Present, no details	Çobanoglu et al. (2019)
		Tekirdağ	Present, no details	Çobanoglu et al. (2019)

APPENDIX C

Import data

TABLE C.1 **Fresh Apples (CN code: 080810)** imported in 100 kg into the EU from regions where *Cenopalpus irani* is known to occur (Source: Eurostat accessed on 17/04/2024).

COYNTRY	2019	2020	2021	2022	2023
Iran	0.38	676.65			
Türkiye	2311.21	19,023.31	9623.89	4148.19	11,943.54

TABLE C.2 **Fresh figures (CN code: 08042010)** imported in 100 kg into the EU from regions where *Cenopalpus irani* is known to occur (Source: Eurostat accessed on 17/04/2024).

COYNTRY	2019	2020	2021	2022	2023
Iran		4.95			12.09
Türkiye	131,193.76	14,002.04	140,278.06	145,396.49	131,483.78

TABLE C.3 **Fresh grapes (CN code: 080610)** imported in 100 kg into the EU from regions where *Cenopalpus irani* is known to occur (Source: Eurostat accessed on 17/04/2024).

COYNTRY	2019	2020	2021	2022	2023
Iran	366.00	399.80	305.77	320.81	354.74
Türkiye	272,447.02	287,605.27	329,852.54	231,996.86	250,773.13

TABLE C.4 **Fresh peaches incl. nectarines (CN code: 080930)** imported in 100 kg into the EU from regions where *Cenopalpus irani* is known to occur (Source: Eurostat accessed on 17/04/2024).

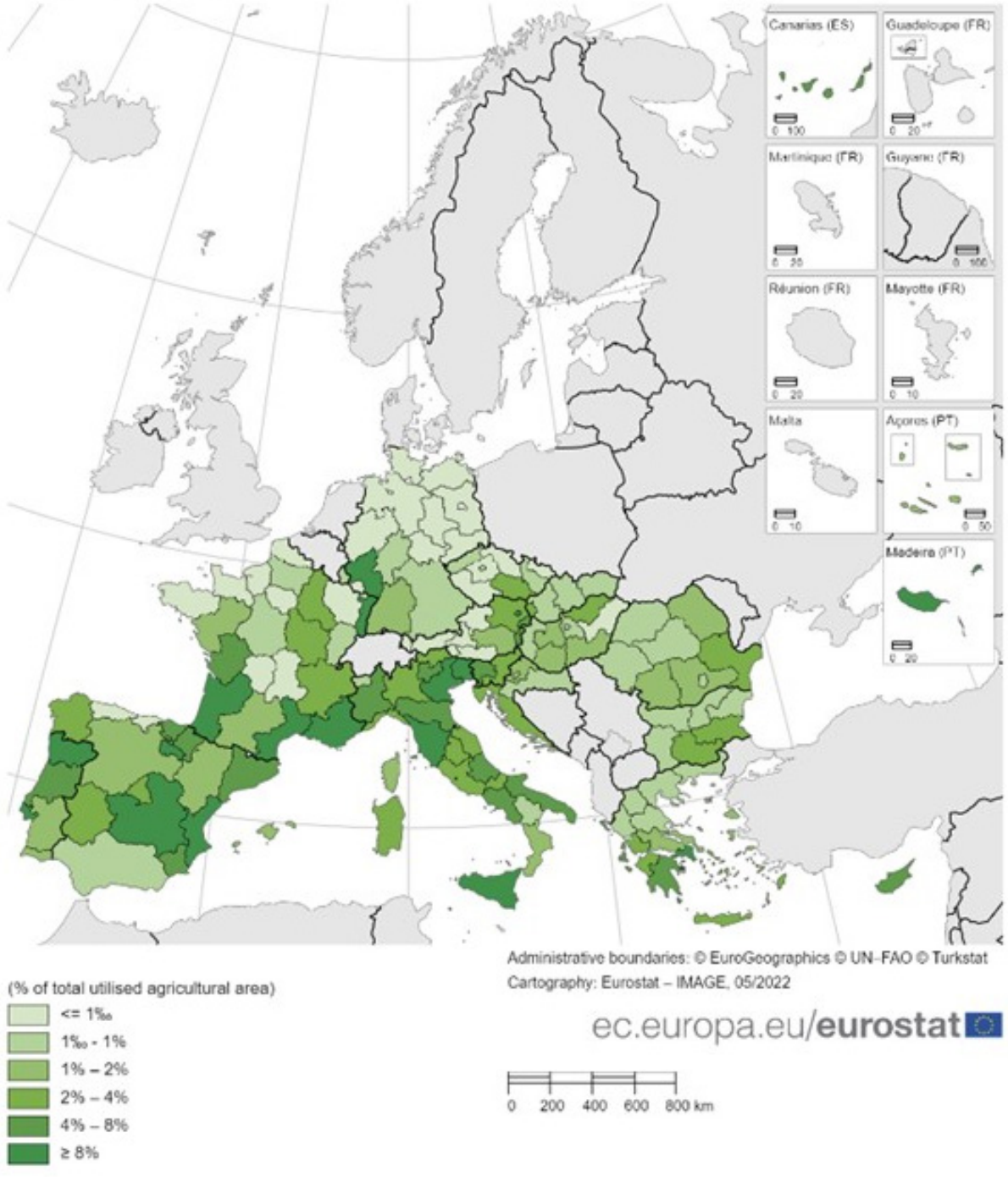
COYNTRY	2019	2020	2021	2022	2023
Iran		234.00	193.90	46.55	205.98
Türkiye	10,520.48	155,418.54	170,429.71	124,960.75	266,760.40

APPENDIX D

Map of EU Vineyard distribution

Map1: Area under vines, by NUTS2 regions, 2020

(% of total utilised agricultural area)



Note: Structural statistics on vineyards cover the EU Member States having a minimum planted area of 500 hectares of vineyards. Therefore Belgium, Estonia, Ireland, Latvia, Lithuania, Malta, the Netherlands, Poland and Sweden are not included in the data collection. Germany: NUTS level 1; Cyprus and Luxembourg: national level.
Eurostat (online data code: vit_t1 and apro_cpshr)