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Pest categorisation of *Unaspis citri*

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Abstract

The Panel on Plant Health performed a pest categorisation of the citrus snow scale, *Unaspis citri* (Comstock) (Hemiptera: Diaspididae), for the European Union (EU). This is a well-defined and distinguishable species, native to south-eastern Asia, which has spread to many tropical and subtropical regions. *U. citri* can be a pest of citrus and has been cited on over 28 different species in 16 plant families. In the EU, *U. citri* occurs in the Azores. There is uncertainty as to whether it occurs in continental Portugal. Reports of it occurring in Greece and Spain are likely to be invalid and based on interception records from these countries. An old Italian record is a misidentification. *U. citri* is listed in Annex IIAI of 2000/29/EC as a harmful organism. The international trade of hosts, as either plants for planting, fruit or cut flowers, provide potential pathways into the EU. However, current EU legislation prohibits the import of citrus plants for planting from third countries. *U. citri* is mostly confined to coastal humid tropical areas and does not occur in semi-arid areas that are irrigated. Nevertheless, given that it occurs in the Azores and that there are regional climatic similarities between places where *U. citri* occurs and climates within the EU, and taking EU host distribution into account, *U. citri* has the potential to establish in the EU, especially in citrus-growing regions around the Mediterranean where losses in quality and yield of citrus could occur. Phytosanitary measures are available to inhibit the likelihood of introduction of *U. citri*. Considering the criteria within the remit of EFSA to assess the status as a potential Union quarantine pest (QP), or as a potential regulated non-quarantine pest (RNQP), *U. citri* meets the criteria assessed by EFSA for consideration as a potential Union QP.

Keywords: Citrus snow scale, white louse scale, citrus, pest risk, 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

Council Directive 2000/29/EC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community establishes the present European Union plant health regime. The Directive lays down the phytosanitary provisions and the control checks to be carried out at the place of origin on plants and plant products destined for the Union or to be moved within the Union. In the Directive's 2000/29/EC annexes, the list of harmful organisms (pests) whose introduction into or spread within the Union is prohibited, is detailed together with specific requirements for import or internal movement.

Following the evaluation of the plant health regime, the new basic plant health law, Regulation (EU) 2016/2031 on protective measures against pests of plants, was adopted on 26 October 2016 and will apply from 14 December 2019 onwards, repealing Directive 2000/29/EC. In line with the principles of the above mentioned legislation and the follow-up work of the secondary legislation for the listing of EU regulated pests, EFSA is requested to provide pest categorizations of the harmful organisms included in the annexes of Directive 2000/29/EC, in the cases where recent pest risk assessment/pest categorisation is not available.

1.1.2. Terms of reference

EFSA is requested, pursuant to Article 22(5.b) and Article 29(1) of Regulation (EC) No 178/2002, to provide scientific opinion in the field of plant health.

EFSA is requested to prepare and deliver a pest categorisation (step 1 analysis) for each of the regulated pests included in the appendices of the annex to this mandate. The methodology and template of pest categorisation have already been developed in past mandates for the organisms listed in Annex II Part A Section II of Directive 2000/29/EC. The same methodology and outcome is expected for this work as well.

The list of the harmful organisms included in the annex to this mandate comprises 133 harmful organisms or groups. A pest categorisation is expected for these 133 pests or groups and the delivery of the work would be stepwise at regular intervals through the year as detailed below. First priority covers the harmful organisms included in Appendix 1, comprising pests from Annex II Part A Section I and Annex II Part B of Directive 2000/29/EC. The delivery of all pest categorisations for the pests included in Appendix 1 is June 2018. The second priority is the pests included in Appendix 2, comprising the group of Cicadellidae (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), the group of Tephritidae (non-EU), the group of potato viruses and virus-like organisms, the group of viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.. and the group of Margarodes (non-EU species). The delivery of all pest categorisations for the pests included in Appendix 2 is end 2019. The pests included in Appendix 3 cover pests of Annex I part A section I and all pests categorisations should be delivered by end 2020.

For the above mentioned groups, each covering a large number of pests, the pest categorisation will be performed for the group and not the individual harmful organisms listed under "such as" notation in the Annexes of the Directive 2000/29/EC. The criteria to be taken particularly under consideration for these cases, is the analysis of host pest combination, investigation of pathways, the damages occurring and the relevant impact.

Finally, as indicated in the text above, all references to 'non-European' should be avoided and replaced by 'non-EU' and refer to all territories with exception of the Union territories as defined in Article 1 point 3 of Regulation (EU) 2016/2031.

1.1.2.1. Terms of Reference: Appendix 1

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

Aleurocantus spp.
Anthonomus bisignifer (Schenkling)
Anthonomus signatus (Say)
Aschistonyx eppoi Inouye
Carposina niponensis Walsingham
Enarmonia packardi (Zeller)
Enarmonia prunivora Walsh
Grapholita inopinata Heinrich
Hishomonus phycitis
Leucaspis japonica Ckll.
Listronotus bonariensis (Kuschel)
Numonia pyrivorella (Matsumura)
Oligonychus perditus Pritchard and Baker
Pissodes spp. (non-EU)
Scirtothrips aurantii Faure
Scirtothrips citri (Moultex)
Scolytidae spp. (non-EU)
Scrobipalpopsis solanivora Povolny
Tachypterellus quadrigibbus Say
Toxoptera citricida Kirk.
Unaspis citri Comstock

(b) Bacteria

Citrus variegated chlorosis
Erwinia stewartii (Smith) Dye
Xanthomonas campestris pv. *oryzae* (Ishiyama) Dye and pv. *oryzicola* (Fang. et al.) Dye

(c) Fungi

Alternaria alternata (Fr.) Keissler (non-EU pathogenic isolates)
Anisogramma anomala (Peck) E. Müller
Apiosporina morbosa (Schwein.) v. Arx
Ceratocystis virescens (Davidson) Moreau
Cercoseptoria pini-densiflorae (Hori and Nambu) Deighton
Cercospora angolensis Carv. and Mendes
Elsinoe spp. Bitanc. and Jenk. Mendes
Fusarium oxysporum f. sp. *albedinis* (Kilian and Maire) Gordon
Guignardia piricola (Nosa) Yamamoto
Puccinia pittieriana Hennings
Stegophora ulmea (Schweinitz: Fries) Sydow & Sydow
Venturia nashicola Tanaka and Yamamoto

(d) Virus and virus-like organisms

Beet curly top virus (non-EU isolates)
Black raspberry latent virus
Blight and blight-like
Cadang-Cadang viroid
Citrus tristeza virus (non-EU isolates)
Leprosis
Little cherry pathogen (non- EU isolates)
Naturally spreading psorosis
Palm lethal yellowing mycoplasm
Satsuma dwarf virus
Tatter leaf virus
Witches' broom (MLO)

Annex IIB

(a) Insect mites and nematodes, at all stages of their development

Anthonomus grandis (Boh.)
Cephalcia lariciphila (Klug)
Dendroctonus micans Kugelan
Gilphinia hercyniae (Hartig)
Gonipterus scutellatus Gyll.
Ips amitinus Eichhof
Ips cembrae Heer
Ips duplicatus Sahlberg
Ips sexdentatus Börner
Ips typographus Heer
Sternochetus mangiferae Fabricius

(b) Bacteria

Curtobacterium flaccumfaciens pv. flaccumfaciens (Hedges) Collins and Jones

(c) Fungi

Glomerella gossypii Edgerton
Gremmeniella abietina (Lag.) Morelet
Hypoxylon mammatum (Wahl.) J. Miller

1.1.2.2. Terms of Reference: Appendix 2

List of harmful organisms for which pest categorisation is requested per group. The list below follows the categorisation included in the annexes of Directive 2000/29/EC.

Annex IAI

(a) Insects, mites and nematodes, at all stages of their development

Group of Cicadellidae (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), such as:

1) *Carneocephala fulgida* Nottingham
2) *Draeculacephala minerva* Ball
3) *Graphocephala atropunctata* (Signoret)

Group of Tephritidae (non-EU) such as:

1) *Anastrepha fraterculus* (Wiedemann)
2) *Anastrepha ludens* (Loew)
3) *Anastrepha obliqua* Macquart
4) *Anastrepha suspensa* (Loew)
5) *Dacus ciliatus* Loew
6) *Dacus curcurbitae* Coquillet
7) *Dacus dorsalis* Hendel
8) *Dacus tryoni* (Froggatt)
9) *Dacus tsuneonis* Miyake
10) *Dacus zonatus* Saund.
11) *Epochra canadensis* (Loew)
12) *Pardalaspis cyanescens* Bezzi
13) *Pardalaspis quinaria* Bezzi
14) *Pterandrus rosa* (Karsch)
15) *Rhacochlaena japonica* Ito
16) *Rhagoletis completa* Cresson
17) *Rhagoletis fausta* (Osten-Sacken)
18) *Rhagoletis indifferens* Curran
19) *Rhagoletis mendax* Curran
20) *Rhagoletis pomonella* Walsh
21) *Rhagoletis suavis* (Loew)

(c) Viruses and virus-like organisms

Group of potato viruses and virus-like organisms such as:

1) Andean potato latent virus
2) Andean potato mottle virus
3) Arracacha virus B, oca strain
4) Potato black ringspot virus
5) Potato virus T
6) non-EU isolates of potato viruses A, M, S, V, X and Y (including Yo, Yn and Yc) and Potato leafroll virus

Group of viruses and virus-like organisms of Cydonia Mill., Fragaria L., Malus Mill., Prunus L., Pyrus L., Ribes L., Rubus L. and Vitis L., such as:

1) Blueberry leaf mottle virus
2) Cherry rasp leaf virus (American)
3) Peach mosaic virus (American)
4) Peach phony rickettsia
5) Peach rosette mosaic virus
6) Peach rosette mycoplasm
7) Peach X-disease mycoplasm
8) Peach yellows mycoplasm
9) Plum line pattern virus (American)
10) Raspberry leaf curl virus (American)
11) Strawberry witches' broom mycoplasma
12) Non-EU viruses and virus-like organisms of *Cydonia Mill., Fragaria L., Malus Mill., Prunus L., Pyrus L., Ribes L., Rubus L.* and *Vitis L.*

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

Group of *Margarodes* (non-EU species) such as:

1) *Margarodes vitis* (Phillipi)
2) *Margarodes vredendalensis* de Klerk
3) *Margarodes prieskaensis* Jakubski

1.1.2.3. Terms of Reference: Appendix 3

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IAI

(a) Insects, mites and nematodes, at all stages of their development

Acleris spp. (non-EU)
Amauromyza maculosa (Malloch)
Anomala orientalis Waterhouse
Arrhenodes minutus Drury
Choristoneura spp. (non-EU)
Conotrachelus nenuphar (Herbst)
Dendrolimus sibiricus Tschetverikov
Diabrotica barberi Smith and Lawrence
Diabrotica undecimpunctata howardi Barber
Diabrotica undecimpunctata undecimpunctata Mannerheim
Diabrotica virgifera zeae Krysan & Smith
Diaphorina citri Kuway
Heliothis zea (Boddie)
Hirschmanniella spp., other than *Hirschmanniella gracilis* (de Man) Luc and Goodey
Liriomyza sativae Blanchard
Longidorus diadecturus Eveleigh and Allen
Monochamus spp. (non-EU)
Myndus crudus Van Duzee
Nacobbus aberrans (Thorne) Thorne and Allen
Naupactus leucoloma Boheman
Premnotrypes spp. (non-EU)
Pseudopityophthorus minutissimus (Zimmermann)
Pseudopityophthorus pruinosus (Eichhoff)
Scaphoideus luteolus (Van Duzee)
Spodoptera eridania (Cramer)
Spodoptera frugiperda (Smith)
Spodoptera litura (Fabricus)
Thrips palmi Karny
Xiphinema americanum Cobb sensu lato (non-EU populations)
Xiphinema californicum Lamberti and Bleve-Zacheo

(b) Fungi

Ceratocystis fagacearum (Bretz) Hunt
Chrysomyxa arctostaphyli Dietel
Cronartium spp. (non-EU)
Endocronartium spp. (non-EU)
Guignardia laricina (Saw.) Yamamoto and Ito
Gymnosporangium spp. (non-EU)
Inonotus weirii (Murril) Kotlaba and Pouzar
Melampsora farlowii (Arthur) Davis
Mycosphaerella larici-leptolepis Ito et al.
Mycosphaerella populorum G. E. Thompson
Phoma andina Turkensteen
Phyllosticta solitaria Ell. and Ev.
Septoria lycopersici Speg. var. *malagutii* Ciccarone and Boerema
Thecaphora solani Barrus
Trechispora brinkmannii (Bresad.) Rogers

(c) Viruses and virus-like organisms

Tobacco ringspot virus
Tomato ringspot virus
Bean golden mosaic virus
Cowpea mild mottle virus
Lettuce infectious yellows virus
Pepper mild tigré virus
Squash leaf curl virus
Euphorbia mosaic virus
Florida tomato virus

(d) Parasitic plants

Arceuthobium spp. (non-EU)

Annex IAII

(a) Insects, mites and nematodes, at all stages of their development

Meloidogyne fallax Karssen
Popillia japonica Newman
Rhizoecus hibisci Kawai and Takagi

(b) Bacteria

Clavibacter michiganensis (Smith) Davis et al. ssp. *sepedonicus* (Spieckermann and Kotthoff) Davis et al.
Ralstonia solanacearum (Smith) Yabuuchi et al.

(c) Fungi

Melampsora medusae Thümen
Synchytrium endobioticum (Schilbersky) Percival

Annex I B

(a) Insects, mites and nematodes, at all stages of their development

Leptinotarsa decemlineata Say
Liriomyza bryoniae (Kaltenbach)

(b) Viruses and virus-like organisms

Beet necrotic yellow vein virus

1.2. Interpretation of the Terms of Reference

Unaspis citri Comstock is one of a number of pests listed in the Appendices to the Terms of Reference (ToR) to be subject to pest categorisation to determine whether it fulfils the criteria of a quarantine pest (QP) or those of a regulated non-quarantine pest (RNQP) for the area of the European Union (EU) excluding Ceuta, Melilla and the outermost regions of Member States (MSs) referred to in Article 355(1) of the Treaty on the Functioning of the European Union (TFEU), other than Madeira and the Azores. However, the current valid name of the organism is *Unaspis citri* (Comstock). The brackets around the authority are not present in the ToR. Comstock originally named and described the organism as *Chionaspis citri* in 1883. Ferris (1937) moved the organism into the genus *Unaspis* to create a new combination which stands as the valid name. The correct name and authority is therefore *Unaspis citri* (Comstock).

2. Data and methodologies

2.1. Data

2.1.1. Literature search

A literature search on *U. citri* 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. Relevant papers were reviewed, further references and information were obtained from experts, from citations within the references and grey literature.

2.1.2. Database search

Pest information, on host(s) and distribution, was retrieved from the EPPO Global Database (EPPO 2017).

Data about the area of hosts grown in the EU were obtained from EUROSTAT (http://ec.europa.eu/eurostat/web/agriculture/data/database).

The Europhyt database was consulted for pest-specific notifications on interceptions and outbreaks. Europhyt is a web-based network launched by the Directorate General for Health and Consumers (DG SANCO), and is a subproject of PHYSAN (Phyto-Sanitary Controls) specifically concerned with plant

health information. The Europhyt database manages 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 MSs and the phytosanitary measures taken to eradicate or avoid their spread.

2.2. Methodologies

The Panel performed the pest categorisation for *U. citri*, following guiding principles and steps presented in the EFSA guidance on the harmonised framework for pest risk assessment (EFSA PLH Panel, 2010) and as defined in the International Standard for Phytosanitary Measures No 11 (FAO, 2013) and No 21 (FAO, 2004).

In accordance with the guidance on a harmonised framework for pest risk assessment in the EU (EFSA PLH Panel, 2010), this work was initiated following an evaluation of the EU's plant health regime. Therefore, to facilitate the decision-making process, in the conclusions of the pest categorisation, the Panel addresses explicitly each criterion for a Union QP and for a Union RNQP in accordance with Regulation (EU) 2016/2031 on protective measures against pests of plants, and includes additional information required as per the specific terms of reference received by the European Commission. In addition, for each conclusion, the Panel provides a short description of its associated uncertainty.

Table 1 presents the Regulation (EU) 2016/2031 pest categorisation criteria on which the Panel bases its conclusions. All relevant criteria have to be met for the pest to qualify either as a QP or as a RNQP. If one of the criteria is not met, the pest will not qualify. In such a case, the working group should consider the possibility to terminate the assessment early and be concise in the sections preceding the question for which the negative answer is reached. Note that a pest that does not qualify as a QP may still qualify as a RNQP which needs to be addressed in the opinion.

It should be noted that the Panel's conclusions are formulated respecting its remit and particularly with regards to the principle of separation between risk assessment and risk management (EFSA founding regulation[1]); therefore, instead of determining whether the pest is likely to have an unacceptable impact, the Panel will present a summary of the observed pest impacts. Economic impacts are expressed in terms of yield and quality losses and not in monetary terms, while addressing social impacts is outside the remit of the Panel, in agreement with EFSA guidance on a harmonised framework for pest risk assessment (EFSA PLH Panel, 2010).

Table 1: Pest categorisation criteria under evaluation, as 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	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)
Identity of the pest (Section 3.1)	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, 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 widely distributed within the EU? Describe the pest distribution briefly!	Is the pest present in the EU territory? If not, it cannot be a regulated non-quarantine pest. (A regulated non-quarantine pest must be present in the risk assessment area)	Is the pest present in the EU territory? If not, it cannot be a protected zone quarantine organism

[1] Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31/1, 1.2.2002, p. 1–24.

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)
Regulatory status (Section 3.3)	If the pest is present in the EU but not widely distributed in the risk assessment area, it should be under official control or expected to be under official control in the near future	Is the pest regulated as a quarantine pest? If currently regulated as a quarantine pest, are there grounds to consider its status could be revoked?	The protected zone system aligns with the pest free area system under the International Plant Protection Convention (IPPC) The pest satisfies the IPPC definition of a quarantine pest that is not present in the PRA area (i.e. protected zone)
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!	Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects? Clearly state if plants for planting is the main pathway!	Is the pest able to enter into, become established in, and spread within, the protected zone areas? Is entry by natural spread from EU areas where the pest is present possible?
Potential for consequences in the EU territory (Section 3.5)	Would the pests' introduction have an economic or environmental impact on the EU territory?	Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?	Would the pests' introduction have an economic or environmental impact on the protected zone areas?
Available measures (Section 3.6)	Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?	Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?	Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated? Is it possible to eradicate the pest in a restricted area within 24 months after the presence of the pest was confirmed in the PZ?
Conclusion of pest categorisation (Section 4)	A statement as to whether (1) all criteria above for consideration as a potential quarantine pest were met and (2) if not, which one(s) were not met	A statement as to whether (1) all criteria above for consideration as a potential regulated non-quarantine pest were met, and (2) if not, which one(s) were not met	A statement as to whether (1) all criteria above for consideration as potential protected zone quarantine pest were met, and (2) if not, which one(s) were not met

The Panel will not indicate in its conclusions of the pest categorisation whether to continue the risk assessment process, but, following the agreed two-step approach, will continue only if requested by the risk managers. However, during the categorisation process, experts may identify key elements and knowledge gaps that could contribute significant uncertainty to a future assessment of risk. It would be useful to identify and highlight such gaps so that potential future requests can specifically target the major elements of uncertainty, perhaps suggesting specific scenarios to examine.

3. Pest categorisation

3.1. Identity and biology of the pest

3.1.1. Identity and taxonomy

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

Yes, *U. citri* is a well-defined insect in the order Hemiptera, family Diaspididae.

The citrus snow scale, also known as white louse scale, *U. citri* (Comstock) (Hemiptera: Diaspididae) was initially described as *Chionaspis citri* from specimens collected on *Citrus* sp. in Louisiana (USA) by Comstock in 1883 (Comstock, 1883). Other former scientific names include: *Chionaspis annae*, *Dinaspis annae*, *Dinaspis veitchi*, *Howardia citri*, *Prontaspis citri*, *Trichomytilus veitchi* and *Unaspis annae* (Buckley and Hodges, 2017; CABI, 2017).

Detailed morphological descriptions, illustrations and keys to the genus *Unaspis* can be found in Balachowsky (1954), Ferris (1937) and Williams and Watson (1988). Watson (2015) provides an identification key to the 19 species of the genus *Unaspis*.

The species *U. citri* and *Unaspis yanonensis* (Kuwana), which can be found on citrus and differ by the numbers of macroducts on the pygidium (EPPO, 2004), were confused over the years making some host and distribution records erroneous (García Morales et al., 2016). Unfortunately, García Morales et al. (2016) do not provide information about the precise erroneous host and distribution records, so the incorrect records cannot be easily identified and discarded.

3.1.2. Biology of the pest

Unaspis citri reproduces sexually. Mated females (sessile, larviform, bright orange in colour and protected under a 2 cm long mussel-shell shaped waxy cover, brown or brown-black, with a distinct longitudinal dorsal ridge) oviposit up to 170 eggs, from which an average of 80 offspring is produced, over a period of 2–3 months. The eggs (ovoid, bright orange in colour, about 0.30 mm long), which remain protected under the female scale, hatch almost immediately, from 30 min to 3 h after oviposition. First instar nymphs (ovoid, bright yellow in colour, with six legs, two-five-segmented antennae and two laterally opposed eye spots), also known as crawlers as this is the only immature stage with functional legs, are attracted to light and move upwards towards the apical twigs or onto the fruit, especially if leaf fall has occurred. Once a feeding site has been selected, the nymphs settle and become sessile for the rest of their development, which differs between males and females. For females, development includes two additional instars with increasingly larger body and cover sizes, similar in shape and colour to the adult female, before reaching the adult stage. For males, there is only one extra nymphal stage plus a prepupal and a pupal stages, which are protected under a white cover (thus, the common name citrus snow scale) about 1 mm long, with three longitudinal ridges. The adult male is yellow to orange in colour, winged, and about 1 mm long. It has long 10-segmented filiform antennae, four dark purple eye spots and no functional mouthparts. They are short-lived and actively fly to locate a mate (EPPO, 1997; Smith et al., 1997; García Morales et al., 2016; Buckley and Hodges, 2017; CABI, 2017).

In *Citrus* spp., *U. citri* feeds primarily on the trunk and tree limbs of older trees, feeding on plant juices, through its long piercing-sucking mouthparts. High populations may also invade leaves and fruit (Russo and Longo 2004; Buckley and Hodges, 2017). In Australia, crawlers may be produced all year round, with the largest numbers appearing in autumn. They are dispersed mainly by wind, but also on farm machinery, clothing and plants (Smith et al., 1997). Optimal temperatures for development range between 25°C and 38°C and developmental thresholds are set at 12°C, with no differences in developmental time between sexes (Arias-Reverón and Browning, 1995). The life cycle takes about 8 weeks in summer (Miller and Davidson, 2005) and, in citrus, there is a variable number of generations per year depending on latitude (García Morales et al., 2016). Two to three discrete generations have been reported in Japan (Mamet, 1943) and Armenia (Ter-Grigorian, 1969). In Australia, 3–4 overlapping generations occur in New South Wales and up to 5–6 in Queensland and the Northern Territory (Smith et al., 1997), the same as in Florida (Bullock and Brooks, 1975).

3.1.3. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes, EPPO produced a standard addressing the detection and identification of *U. citri* (EPPO, 2004).

Detection: all developmental stages of *U. citri* can be found on fruit, bark and leaves of their host plants. Heavy field infestations can be easily detected because of the snowy appearance of the plants, resulting from the presence of the numerous white scale covers of immature male stages. Infestation begins on the trunk and quickly spreads to branches and twigs (EPPO, 2004; Buckley and Hodges, 2017). Sticky cards can be used to detect crawlers, adult males and *U. citri* adult parasitoids (Arias-Reverón and Browning, 1995).

Symptoms: early symptoms include reduced tree vigour and fruit production. Leaves show chlorotic areas where the scales are feeding. Heavily spotted leaves may drop prematurely. Infested fruits are stunted and have a pitted appearance. Twigs and even large limbs in the centre of the canopy may die causing weakening of the tree and dieback of branches. Normal growth of the bark is prevented, making the trees become 'hidebound'. Although increase of trunk and limb diameter is resumed when *U. citri* population density decreases, the toughened bark may not be able to follow it, and may split, thus allowing access to borers and pathogens.

Identification: Diaspididae (armoured scales) are identified first by studying the shape, dimension and colour of the scale cover under a stereomicroscope. For species identification, the body of adult females should be studied. Specimens removed from under the cover have to be cleared and prepared for morphological study under a microscope and can be identified to species level using existing keys (EPPO, 2004).

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

Unaspis citri is native to South-East Asia in the continental region between south-eastern India and eastern China (Smith et al., 1997), and has spread widely in many citrus growing areas, including other countries in Asia, North, Central and South America, Africa and Oceania (see Table 2, Figure 1).

The inclusion of Turkey and Uzbekistan in Table 2 results from *U. citri* being intercepted in Belgium on *Vitis vinifera* fruit (grapes) imported from Turkey but originally produced in Uzbekistan, two countries and a host plant not previously reported. There is uncertainty regarding whether *U. citri* occurs in both Turkey and Uzbekistan or only in one of them.

Table 2: Distribution of *Unaspis citri* outside the EU

Region	Country	Subnational distribution	Status	Reference	Remarks
Asia	Armenia		Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	China	Guangdong	Present	CABI (2017)	
		Guangxi	Present	García Morales et al. (2016), Buckley and Hodges (2017)	
		Hainan	Present	García Morales et al. (2016), Buckley and Hodges (2017)	
		Hong Kong	Present	CABI (2017)	
		Hubei	Present	García Morales et al. (2016), Buckley and Hodges (2017)	
		Shaanxi	Present	García Morales et al. (2016)	

Region	Country	Subnational distribution	Status	Reference	Remarks
		Sichuan	Present	García Morales et al. (2016), Buckley and Hodges (2017)	
		Zhejiang	Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	Indonesia	Java	Present	CABI (2017)	
		Kalimantan	Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	Japan		Present	CABI (2017)	
	Malaysia	Malaya	Present	García Morales et al. (2016)	
		Peninsular Malaysia	Present	CABI (2017)	
	Philippines	Luzon	Present	García Morales et al. (2016)	
		Mindanao	Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	Singapore		Present	CABI (2017)	
	Syria		Present	CABI (2017)	
	Taiwan		Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	Thailand		Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	Turkey		Unconfirmed	Europhyt	(see Section 3.4.2)
	Uzbekistan		Unconfirmed	Europhyt	(see Section 3.4.2)
	Vietnam		Present	CABI (2017)	
	Yemen		Widespread	CABI (2017)	
Africa	Algeria		Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	Benin		Present	CABI (2017)	
	Cameroon		Present	CABI (2017)	
	Comoros		Present	CABI (2017)	
	Congo		Present	CABI (2017)	
	Congo Dem. Rep.		Present	CABI (2017)	
	Côte d'Ivoire		Present	CABI (2017)	
	Egypt		Present	CABI (2017)	
	Gabon		Present	CABI (2017)	
	Guinea		Present	CABI (2017)	
	Liberia		Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	Madagascar		Present	CABI (2017)	
	Mali		Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	Mauritius		Present	CABI (2017)	

Region	Country	Subnational distribution	Status	Reference	Remarks
	Niger		Present	CABI (2017)	
	Nigeria		Present	CABI (2017)	
	Senegal		Present	CABI (2017)	
	Seychelles		Present	García Morales et al. (2016)	
	Sierra Leone		Present	CABI (2017)	
	South Africa		Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	Togo		Present	CABI (2017)	
	Zaire		Present	García Morales et al. (2016), Buckley and Hodges (2017)	
North America	Bermuda		Present	CABI (2017)	
	Mexico		Present	CABI (2017)	
		Tamaulipas	Present	García Morales et al. (2016)	
		Veracruz	Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	USA	California	Present	CABI (2017)	
		Florida	Present	CABI (2017)	
		Georgia	Present	CABI (2017)	
		Louisiana	Present	CABI (2017)	
		Mississippi	Present	García Morales et al. (2016), Buckley and Hodges (2017)	
		Virginia	Present	García Morales et al. (2016), Buckley and Hodges (2017)	
Central America and Caribbean	Antigua and Barbuda		Present	CABI (2017)	
	Barbados		Present	CABI (2017)	
	Costa Rica		Present	CABI (2017)	
	Cuba		Present	CABI (2017)	
	Curaçao		Present	García Morales et al. (2016)	
	Dominica		Present	CABI (2017)	
	Dominican Rep.		Present	CABI (2017)	
	El Salvador		Present	CABI (2017)	
	France	Guadeloupe	Present	CABI (2017)	
		Martinique	Present	CABI (2017)	
	Grenada		Present	CABI (2017)	
	Haiti		Present	CABI (2017)	
	Honduras		Present	CABI (2017)	
	Jamaica		Present	CABI (2017)	
	Panama		Present	CABI (2017)	
	Puerto Rico		Present	CABI (2017)	
	St. Kitts and Nevis		Restricted distribution	CABI (2017)	
	St. Lucia		Present	CABI (2017)	

Region	Country	Subnational distribution	Status	Reference	Remarks
	St. Vincent and the Grenadines		Present	CABI (2017)	
	Trinidad and Tobago		Present	CABI (2017)	
	British Virgin Islands		Present	CABI (2017)	
	Montserrat		Present	CABI (2017)	
	Ste. Croix		Present	García Morales et al. (2016)	
	US Virgin Islands		Present	CABI (2017)	
South America	Argentina		Present	CABI (2017)	
	Bolivia		Present	CABI (2017)	
	Brazil	Espirito Santo	Present	CABI (2017)	
		Mato Grosso	Present	García Morales et al. (2016)	
		Rio de Janeiro	Present	CABI (2017)	
		Rio Grande do Sul	Present	CABI (2017)	
		São Paulo	Present	CABI (2017)	
	Chile		Present	CABI (2017)	
	Colombia		Present	CABI (2017)	
	Ecuador		Present	CABI (2017)	
	French Guyana		Present	García Morales et al. (2016)	
	Guyana		Present	CABI (2017)	
	Paraguay		Present	CABI (2017)	
	Peru		Present	CABI (2017)	
	Uruguay		Present	CABI (2017)	
	Venezuela		Present	CABI (2017)	
Oceania	Australia	New South Wales	Restricted distribution	CABI (2017)	
		Northern Territory	Present	Smith et al. (1997)	
		Queensland	Present	CABI (2017)	
		Victoria	Present	CABI (2017)	
	Cook Islands		Present	CABI (2017)	
	Fiji		Present	CABI (2017)	
	New Caledonia		Present	CABI (2017)	
	Wallis and Futuna Islands		Present	CABI (2017)	
	Kiribati		Present	CABI (2017)	
	Federated states of Micronesia		Present	CABI (2017)	
		Ponape Island	Present	García Morales et al. (2016)	
		Truk Islands	Present	García Morales et al. (2016); Buckley and Hodges (2017)	
	New Zealand		Absent, invalid record	CABI (2017)	
	Niue		Present	CABI (2017)	
	Papua New Guinea		Present	CABI (2017)	
	Solomon Islands		Present	CABI (2017)	

Region	Country	Subnational distribution	Status	Reference	Remarks
	Tonga		Present	CABI (2017)	
	American Samoa		Present	García Morales et al. (2016), Buckley and Hodges (2017)	
	Hawaii: Oahu island		Present	García Morales et al. (2016); Buckley and Hodges (2017)	
	Vanuatu		Present	CABI (2017)	
	Western Samoa (known as Samoa until 1997)		Present	CABI (2017)	

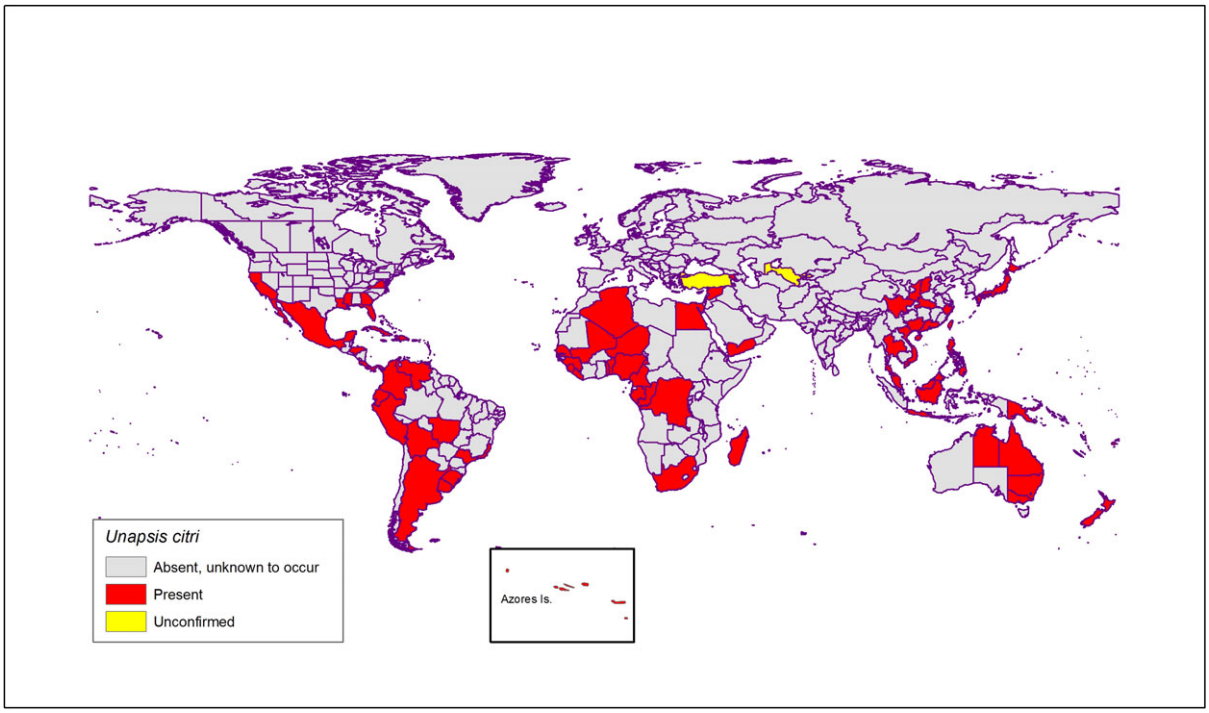

Figure 1: Global distribution of *U. citri* (based on Table 2 and Section 3.2.2)

3.2.2. Pest distribution in the EU

Is the pest present in the EU territory? If present, is the pest widely distributed within the EU?

The pest is present in the EU in the Azores (PT) (Franco et al., 2011). There is uncertainty regarding the occurrence of *U. citri* in continental Portugal.

Reports of *U. citri* in Greece, Italy, Malta and Spain are unreliable.

According to CABI (2017), *U. citri* is present in Malta as well as Portugal. However, Mifsud et al. (2014) carried out extensive field surveys in the Maltese Archipelago and did not find any evidence of *U. citri*. In addition, there appears to be no slide-mounted material deposited in museum collections to support the report of *U. citri* being present in Malta. *U. citri* is now regarded as absent from Malta (C. Malumphy pers comm, January 2018).

A recent compilation about *U. citri* by García Morales et al. (2016) state that it is present in Greece, Italy and Spain, based on information from Nakahara (1982) for Greece and Spain and Newstead (1907) for Italy. Records from Greece and Spain in Nakahara (1982) refer to interceptions of *U. citri* reported by Greece and Spain and are not considered as true records of the pest being established in those countries. In addition, the Spanish reference laboratory in Madrid was consulted and the absence of *U. citri* records from Spain has been confirmed (P. Del Estal, pers. comm. January 2018).

Data from Newstead (1907) for Italy actually refers to findings on *Euonymus*, the host for the closely related *Unaspis* (= *Chionaspis*) *euonymi* (Comstock), which is present in EU and not a QP. Therefore, the Newstead (1907) report of *U. citri* is considered a misidentification (C. Malumphy, pers. comm., January 2018).

Kozár and Franco (1995) report *U. citri* from mainland Portugal. However, their report is based on a single sample from Vila Nova de Gaia taken in 1889 and found in a slide collection of the British Museum in London. *U. citri* has not been found in mainland Portugal again since then (Franco et al., 2011).

The absence of *U. citri* from the Netherlands has been confirmed by surveys (CABI, 2017).

Overall we conclude that *U. citri* has a restricted distribution in the EU, occurring in the Azores (Franco et al., 2011). There is uncertainty as to whether it also occurs in mainland continental Portugal.

3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

The organism subject to pest categorisation is listed in Council Directive 2000/29/EC as *Unaspis citri*. Details are presented in Tables 3 and 4.

Table 3: *Unaspis citri* in Council Directive 2000/29/EC

Annex II, Part A **Harmful organisms whose introduction into, and spread within, all Member States shall be banned if they are present on certain plants or plant products**		
Section I **Harmful organisms not known to occur in the Community and relevant for the entire Community**		
(a)	Insects, mites and nematodes, at all stages of their development	
	Species	Subject of contamination
32.	*Unaspis citri* Comstock	Plants of *Citrus* L, *Fortunella* Swingle, *Poncirus* Raf., and their hybrids, other than fruit and seeds

(Note that the authority Comstock is interpreted as being (Comstock) - see 1.2)

3.3.2. Legislation addressing plants and plant parts on which *Scirtothrips citri* is regulated

Table 4: Regulated hosts and commodities that may involve *U. citri* in Annexes III, IV, and V of Council Directive 2000/29/EC

Annex III, Part A	**Plants, plant products and other objects the introduction of which shall be prohibited in all Member States**	
	Description	Country of origin
16	Plants of *Citrus* L, *Fortunella* Swingle, *Poncirus* Raf., and their hybrids, other than fruit and seeds	Third countries

Annex IV, Part A	**Special requirements which shall be laid down by all member states for the introduction and movement of plants, plant products and other objects into and within all member states**	
Section I	**Plants, plant products and other objects originating outside the community**	
	Plants, plant products and other objects	Special requirements

16.1	Fruits of *Citrus* L, *Fortunella* Swingle, *Poncirus* Raf., and their hybrids, originating in third countries	The fruits should be free from peduncles and leaves and the packaging should bear an appropriate origin mark.
16.5	Fruits of *Citrus* L, *Fortunella* Swingle, *Poncirus* Raf., and their hybrids, originating in third countries	Without prejudice to the provisions applicable to the fruits in Annex IV(A)(I) (16.1), (16.2) and (16.3), official statement that: a) the fruits originate in areas known to be free from the relevant organism; or, if this requirement cannot be met; b) no signs of the relevant organism have been observed at the place of production and in its immediate vicinity since the beginning of the last complete cycle of vegetation, on official inspections carried out at least monthly during the three months prior to harvesting, and none of the fruits harvested at the place of production has shown, in appropriate official examination, signs of the relevant organism, or if this requirement can also not be met; c) the fruits have shown, in appropriate official examination on representative samples, to be free from the relevant organism in all stages of their development; or, if this requirement can also not be met; d) the fruits have been subjected to an appropriate treatment, any acceptable vapour heat treatment, cold treatment, or quick freeze treatment, which has been shown to be efficient against the relevant organism without damaging the fruit, and, where not available, chemical treatment as far as it is acceptable by Community legislation.
Annex V	**Plants, plant products and other objects which must be subject to a plant health inspection (at the place of production if originating in the Community, before being moved within the Community—in the country of origin or the consignor country, if originating outside the Community) before being permitted to enter the Community**	
Part B	**Plants, plant products and other objects originating in territories, other than those territories referred to in Part A**	
Section I	**Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community**	
1	Plants, intended for planting, other than seeds but including seeds of [...] *Citrus* L., *Fortunella* Swingle and *Poncirus* Raf., and their hybrids [...]	
3	Fruits of: — *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf., *Microcitrus* Swingle, *Naringi* Adans., *Swinglea* Merr. and their hybrids [...]	

3.4. Entry, establishment and spread in the EU

3.4.1. Host range

The main hosts of primary concern for *U. citri* worldwide are citrus. However, the reported host range of *U. citri* is fairly broad with more than 28 species from 16 plant families (García Morales et al., 2016; CABI, 2017). Appendix A provides a list of plant species reported to be *U. citri* hosts. Most of them correspond to tropical crops, both woody (e.g. *Citrus* spp. (citrus), *Pisidium* (guava)) and herbaceous (e.g. *Tillandsia*). Some host plants can be used as ornamentals (e.g. *Hibiscus*, *Tillandsia*).

Current European Commission legislation does not regulate *U. citri* by name on all of its hosts.

3.4.2. Entry

Is the pest able to enter into the EU territory? (Yes or No)

Yes, pathways that could allow *U. citri* to enter the EU exist.

The pest is already present in the EU, in the Azores (Soares et al., 1997; Franco et al., 2011). There is uncertainty as to whether it also occurs in mainland Portugal (see Section 3.2.2).

EUROPHYT records indicate that *U. citri* has been intercepted three times in the EU:

- in 2009 in the UK on *Citrus sinensis* fruit (sweet oranges) imported from China
- in 2011 in Spain on *Citrus aurantium* fruit (sour oranges) from the Dominican Republic, and
- in 2012 in Belgium on *Vitis vinifera* fruit (grapes) imported from Turkey but originally produced in Uzbekistan, (see Section 3.2.1).

In addition to the fruit pathway, other pathways for *U. citri* could be:

- plants for planting,
- cut flowers,

Current EU legislation prohibits the import of plants of *Citrus*, *Fortunella, Poncirus* and their hybrids, other than fruit and seeds from third countries. Therefore, the last two pathways can be considered as closed for citrus. However, all three pathways remain open for the other hosts (including the Rutaceae genera *Glycosmis* and *Murraya*).

Eurostat trade data poorly discriminates between species of plants for planting. Fortunately, the Netherlands NPPO kindly provided EFSA with detailed trade inspection data regarding plants for planting from 2012 to 2014. Table 5 provides some examples of *U. citri* hosts imported as plants for planting from a few of the countries where *U. citri* occurs. Given the host range and wide distribution of *U. citri*, Table 5 is not comprehensive and does not indicate all pathways but is provided to indicate that potential pathways into the EU exist via plants for planting.

Table 5: Examples of *Unaspis citri* host plants which have been imported into the EU as plants for planting from countries where *U. citri* is known to occur (Source: The Netherlands NPPO)

	Costa Rica			China			USA		
Genus	**2012**	**2013**	**2014**	**2012**	**2013**	**2014**	**2012**	**2013**	**2014**
Hibiscus	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tillandsia	✓	✓	✓	✓	✓	✓	✓	✓	✓
Annona			✓				✓	✓	

3.4.3. Establishment

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

Yes, there are hosts within suitable climatic regions in the EU, comparable to regions where *U. citri* occurs.

3.4.3.1. EU distribution of main host plants

A range of plant species reported as hosts to *U. citri* occurs in the EU. For example, cultivated fruit such as *Citrus* spp., *Mangifera indica, Persea americana* and *Vitis vinifera*, as well as some ornamental plants, e.g. *Hibiscus* spp., *Cocos nucifera, Pittosporum* spp. The main host in the EU at risk is assumed to be citrus, for which the cultivated area is shown in Table 6. Grapes, which are a new host-pest association described in this opinion (see Section 3.4.2), would be also at risk and the cultivated area is presented in Table 7.

Table 6: Citrus cultivation area (10^3 ha) in the EU. Source: Eurostat (data extracted on 7 Jun 2017)

Country	2011	2012	2013	2014	2015
Spain	317.61	310.50	306.31	302.46	298.72
Italy	160.72	146.79	163.59	140.16	149.10
Greece	52.06	50.61	49.88	49.54	46.92
Portugal	19.59	19.85	19.82	19.80	20.21
France	3.77	3.89	4.34	4.16	4.21
Cyprus	3.06	3.21	2.63	2.69	2.84
Croatia	2.12	1.88	2.17	2.17	2.21
EU (28 MS)	558.93	536.73	548.75	520.99	524.21

Table 7: Grape cultivation area (10^3 ha) in the EU. Source: Eurostat (data extracted on 4 Jan 2018)

Country	2011	2012	2013	2014	2015
Spain	963.10	947.10	946.97	947.28	941.06
France	763.93	760.85	760.55	757.34	752.33
Italy	717.57	697.72	702.11	682.18	678.98
Portugal	179.47	179.47	179.50	178.99	178.97
Romania	174.86	176.47	176.88	174.63	176.12
Greece	103.18	99.24	110.85	110.77	114.39
Hungary	75.51	72.32	69.32	70.72	72.20
Bulgaria	46.10	60.44	50,20	31.89	38.71
Austria	43.84	43.62	44.00	44.79	43.78
Croatia	32.47	29.28	28.00	25.75	25.59
Slovenia	16.35	16.36	16.10	16.02	15.71
Czech Republic	16.01	15.67	15.65	15.78	15.81
Slovakia	9.93	10.49	11.96	8.76	8.80
Cyprus	7.71	6.81	5.92	6.16	6.60
Luxembourg	1.22	1.22	1.24	1.25	1.25
United Kingdom	1.00	1.51	1.40	2.00	1.80
Malta	0.61	0.61	Not available	Not available	0.68
EU 28	3,253.19	3,219.46	Not available	Not available	3,173.83

3.4.3.2. Climatic conditions affecting establishment

Unaspis citri already occurs in the EU in the Azores. The Koppen–Geiger classification of climatic regions (Peel et al., 2007) where *U. citri* occurs, includes countries and regions (e.g. Algeria, Armenia, Australia, California, Egypt, Florida and South Africa) that share climate types which are also found in Europe where citrus and grapes are grown, predominantly around the Mediterranean Basin. However, elsewhere *U. citri* is mostly confined to coastal humid tropical areas and does not occur where there is a dry season even when these semi-arid areas are irrigated (EPPO, 1997). Although the EU does share climate types with those of countries where *U. citri* occurs, without a more detailed study, beyond the scope of pest categorisation, it is unclear how much of the EU would provide suitable climatic conditions that would support the establishment of *U. citri*. There is uncertainty as to whether *U. citri* could establish widely in the EU citrus growing regions.

3.4.4. Spread

Is the pest able to spread within the EU territory following establishment? (Yes or No) How?

Yes, *U. citri* can spread naturally. However, this type of spread is most likely limited.

RNQPs: Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects?

Yes, the invasion of areas distant from its native range should be most probably attributed to human-assisted dispersal.

As most armoured scales (Hemiptera: Diaspididae), *U. citri* can only actively disperse as crawlers (first instar nymphs), which may also use birds or the wind to leave the original patch. However, other sessile developmental stages can be easily carried on consignments of plant material and fruit.

The potential for *U. citri*, to spread on nursery plant material can be appraised from what happened in citrus in Florida in the 1960s. The pest changed its economic status as a consequence of a devastating freeze in 1962. Many growers replaced the damaged trees with new saplings from nurseries. These new citrus trees were already infested with *U. citri*, and once transplanted within the new groves, the pest spread to already established trees. The pest became rapidly established within the state (Bullock and Brooks, 1975).

3.5. Impacts

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

Yes, the introduction of *U. citri* would most likely impact at least the quality and yield of citrus production in the EU.

RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?[2]

Yes, the presence of *U. citri* on plants for planting would impact their intended use.

3.5.1. Potential pest impacts

3.5.1.1. Direct impacts of the pest

Unaspis citri is one of the main pests of *Citrus* spp. in many of the citrus-growing regions of the world, especially in the tropics (EPPO, 1997). In Australia, *U. citri* is considered a major pest of citrus in the tropical and subtropical coastal districts of Queensland and the Northern Territory. However, it is considered as an occasionally important pest in temperate New South Wales. All citrus cultivars are attacked but Imperial mandarins are the least affected (Smith et al., 1997). Heavy infestations, which are more common in older trees, cause extensive drying and splitting of the bark on the trunk and main limbs (EPPO, 1997; Smith et al., 1997). This type of damage could be expected in the EU.

In the Azores, *U. citri* is one of the most abundant armoured scale species in citrus orchards and chemical treatments are applied regularly to minimise impacts (Soares et al., 1997).

There are no impacts described for grapevine, which is another host not previously reported (see Section 3.4.2). This may be related to the fact that grapes are not commonly grown in tropical/subtropical humid climates. Therefore, direct damage is assumed to be low but with high uncertainty.

3.6. Availability and limits of mitigation measures

Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?

Yes, phytosanitary measures against *U. citri* are available to reduce the likelihood of its introduction into the EU. Further control measures are available to hamper establishment and spread of this scale.

[2] See Section 2.1 on what falls outside EFSA's remit.

3.6.1. Phytosanitary measures

Phytosanitary measures are currently applied to *Citrus* L.*, Fortunella* Swingle*, Poncirus* Raf. and their hybrids (see Section 3.3.2), however, pathways exist via other hosts. The following phytosanitary measures are available for them:

- Sourcing plants for planting (and cut flowers) from pest free area (PFA), pest free place of production (PFPP), pest free site (PFS)
- Introduction of plants for planting in a dormant stage with no soil attached.

Whether *U. citri* is being officially controlled in the Azores is unknown.

3.6.2. Biological or technical factors affecting the feasibility and effectiveness of measures to prevent the entry, establishment and spread of the pest

- The size and colour of *U. citri* hampers its detection, especially of small populations.
- The high polyphagy of *U. citri*, with many potential hosts remaining unregulated with respect to *U. citri*.
- Uncertainty regarding hosts and geographical distribution outside of its native range means that there may be a diversity of potential pathways that could facilitate entry into the EU.

3.6.3. Control methods

- Biological control: in its native range, *U. citri* has many natural enemies, mostly parasitic wasps (Hymenoptera: Aphelinidae and Encyrtidae) and predatory ladybirds (Coleoptera: Coccinellidae).
- Chemical control: insecticides may be applied several times in coincidence with peak production of crawlers. These pesticides should be selective for key natural enemies.
- Integrated Pest Management (IPM): economic thresholds have been established for this pest in citrus in Australia. These are based on tree for infestation.

3.7. Uncertainty

There are three main sources of uncertainty, the first regards *U. citri* host range, the second its distribution, and the third the extent of potential establishment within the EU. *U. citri* is polyphagous and phytosanitary measures are targeted on citrus. Other reported (but not confirmed) fruit hosts, e.g. grapes, mangoes, avocados and ornamentals such as hibiscus could also provide potential pathways. This uncertainty, though, does not affect the conclusions of this categorisation. Regarding the geographical distribution of *U. citri* in Europe, literature confirms its presence in the Azores (e.g. Soares et al., 1997). While Franco et al. (2011) cites references reporting *U. citri* from mainland Portugal, the original references have not been seen and there is uncertainty about the interpretation of the references. While the presence of *U. citri* in the Azores indicates that the organism can establish within the EU, there is uncertainty regarding how much further within the EU the pest could spread given the absence of tropical and subtropical humid climates.

4. Conclusions

Considering the criteria within the remit of EFSA to assess the status as a potential Union QP, or as a potential RNQP, *U. citri* meets the criteria assessed by EFSA for consideration as a potential Union QP (Table 8).

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

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	The identity of the pest is established. Conventional taxonomic keys based on morphology of adults exist	The identity of the pest is established. Conventional taxonomic keys based on morphology of adults exist	No uncertainties
Absence/ presence of the pest in the EU territory (Section 3.2)	The pest has a restricted distribution in the EU territory (Azores). Therefore, it could be regulated as a Union quarantine pest if official measures are applied where it occurs	The pest is not widely present in the EU territory. Therefore, it fails a criterion required for it to be a regulated non-quarantine pest	There are uncertainties about the presence of this pest in mainland Portugal
Regulatory status (Section 3.3)	The pest has a restricted distribution in the EU and is currently regulated as a quarantine pest	The pest is currently regulated as a quarantine pest and there are no grounds to consider its status could be revoked	There are uncertainties regarding whether official measures are being applied in the Azores
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	The pest could enter into, become established in, and spread within, the EU territory and the main pathways would be: • Plants for planting • Fruit • Cut flowers	Spread is most likely mainly via plants for planting and fruit, rather than via natural spread, as only first instar nymphs (crawlers) can actively move (short distances) or be carried by air currents or birds	Given the polyphagy of *U. citri*, there is uncertainty regarding providing a comprehensive list of all pathways (i.e. which plants/plant parts could provide a pathway)
Potential for consequences in the EU territory (Section 3.5)	The pests' introduction could cause quality and yield losses to citrus	The presence of the pest on plants for planting would most have an impact on plants for planting	Impact on vineyards would probably be small but this is highly uncertain
Available measures (Section 3.6)	There are risk reduction options available to prevent the entry into, establishment within or spread of the pest within the EU, including the sourcing of plants for planting from PFA	Risk reduction options including chemical control and the production of plants in a pest-free environment should help to prevent pest presence on plants for planting	No uncertainties
Conclusion on pest categorisation (Section 4)	All criteria above for consideration as a potential quarantine pest are met	As this pest has a restricted distribution in the EU, this criterion of a wider presence in the EU, which should be fulfilled for consideration as a potential regulated non-quarantine pest, is not met. As a consequence, *U. citri* does not meet all the criteria for consideration as a potential regulated non-quarantine pest	It is unknown if official measures are in place against *U. citri* in the Azores. To satisfy the criteria required for QP status, official measures should be in place where the pest occurs in the EU
Aspects of assessment to focus on/ scenarios to address in future if appropriate	Any further assessment should gather information on (i) the geographic distribution of *U. citri* in Portugal and elsewhere in Europe, (ii) whether *U. citri* is under official control in the Azores, (iii) the endangered area within the EU and (iii) the host status and impact of *U. citri* on grapes		

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Abbreviations

DG SANCO	Directorate General for Health and Consumers
EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
IPM	Integrated Pest Management
IPPC	International Plant Protection Convention
MS	Member State
PFA	pest free area
PFPP	pest free place of production
PFS	pest free site
PLH	EFSA Panel on Plant Health
PZ	protected zone
QP	quarantine pest
RNQP	regulated non-quarantine pest
TFEU	Treaty on the Functioning of the European Union
ToR	Terms of Reference

Appendix A – Reported host plants of *Unaspis citri*

Family	Host (common name)	Reference
Anacardiaceae	*Mangifera* sp.	García Morales et al. (2016)
	Mangifera indica (mango).	García Morales et al. (2016)
Annonaceae	*Annona muricata* (soursop)	CABI (2017)
Arecaceae	*Cocos nucifera* (coconut)	CABI (2017)
Bromeliaceae	*Ananas comosus* (pineapple)	CABI (2017)
	Tillandsia usneoides (Spanish moss)	CABI (2017)
Celastraceae	*Euonymus* sp.	García Morales et al. (2016)
	Euonymus japonicus (Japanese spindle).	García Morales et al. (2016)
Fabaceae	*Acacia oshanesii*	García Morales et al. (2016)
	Inga sp.	García Morales et al. (2016)
Lauraceae	*Persea americana* (avocado)	García Morales et al. (2016)
Malvaceae	*Hibiscus* spp. (rosemallows)	CABI (2017)
Moraceae	*Artocarpus heterophyllus* (jackfruit)	CABI (2017)
Musaceae	*Musa* sp. (banana)	CABI (2017)
Myrtaceae	*Psidium guajava* (guava)	CABI (2017)
Oleaceae	*Osmanthus* sp.	García Morales et al. (2016)
Pittosporaceae	*Pittosporum* sp.	García Morales et al. (2016)
Rutaceae	*Citrus* sp. (citrus)	CABI (2017)
	Citrus aurantifolia (lime)	CABI (2017)
	Citrus aurantium(sour orange)	CABI (2017)
	Citrus limon (lemon)	CABI (2017)
	Citrus maxima (pummelo)	CABI (2017)
	Citrus reticulate (mandarin)	CABI (2017)
	Citrus sinensis (sweet orange)	CABI (2017)
	Citrus x *paradisi* (grapefruit)	CABI (2017)
	Fortunella spp. (kumquat)	CABI (2017)
	Glycosmis parviflora	García Morales et al. (2016)
	Poncirus trifoliata (trifoliate orange)	CABI (2017)
	Murraya paniculata	García Morales et al. (2016)
Sapindaceae	*Nephelium lappaceum*	García Morales et al. (2016)
Vitaceae	*Vitis vinifera* (grapes)	This opinion, see Section 3.4.2