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Pest categorisation of *Scaphoideus luteolus*

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Abstract

The Panel on Plant Health performed a pest categorisation of *Scaphoideus luteolus*, a well-defined phloem sap-feeding insect species in the family Cicadellidae (Insecta: Hemiptera). It can be identified using taxonomic keys. *S. luteolus* is only present in the eastern part of the USA. The main host plants of *S. luteolus* are species of the genus *Ulmus* (*U. americana*, *U. alata*, *U. bergmanianna*, *U. szechuanica*, *U. rubra*), but specimens have also been collected on *Vitis* sp., *Salix* sp. and *Populus* sp. The species does not cause damage by itself, but it is the only confirmed vector of the phytoplasma *Candidatus* Phytoplasma ulmi (CPu), which is present in North America where it causes heavy damage to the local elms, as well as in some European countries where the local elms are considered less susceptible. *S. luteolus* has three developmental stages (egg, nymph, adult). It overwinters in the egg stage, takes 36–42 days to complete nymphal stage, and adults are found throughout the summer period. Both nymphs and adults are capable of transmitting CPu and, after acquiring the pathogen, remain infective for the rest of their life. The main pathways are cut branches and plants for planting. These pathways are not regulated for the main host, *Ulmus*, though requirements are in place in relation to other pests on *Ulmus*. These pathways are also not regulated for *Salix*. Establishment would be favoured by the wide coverage of *Ulmus* spp. in the EU territory and by climatic conditions comparable to those of the pest's native range. *S. luteolus* meets all the criteria assessed by EFSA for consideration as potential Union quarantine pest. The criteria for considering it as a potential Union regulated non-quarantine pest are not met since the species is absent from the EU.

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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/EC¹ 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) 2016/2031² 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 178/2002,³ 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 Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. OJ L 169/1, 10.7.2000, p. 1–112.

² Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants. OJ L 317, 23.11.2016, p. 4–104.

³ 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.

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

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

(b) Bacteria

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

(c) Fungi

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

(d) Virus and virus-like organisms

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

Annex IIB

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

<i>Anthonomus grandis</i> (Boh.)	<i>Ips cembrae</i> Heer
<i>Cephalcia lariciphila</i> (Klug)	<i>Ips duplicatus</i> Sahlberg
<i>Dendroctonus micans</i> Kugelán	<i>Ips sexdentatus</i> Börner
<i>Gilpinia hercyniae</i> (Hartig)	<i>Ips typographus</i> Heer
<i>Gonipterus scutellatus</i> Gyll.	<i>Sternochetus mangiferae</i> Fabricius
<i>Ips amitinus</i> Eichhof	

(b) Bacteria

Curtobacterium flaccumfaciens pv.
flaccumfaciens (Hedges) Collins and Jones

(c) Fungi

Glomerella gossypii Edgerton

Hypoxyton mammatum (Wahl.) J. Miller

Gremmeniella abietina (Lag.) Morelet

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) <i>Carneiocephala fulgida</i> Nottingham | 3) <i>Graphocephala atropunctata</i> (Signoret) |
| 2) <i>Draeculacephala minerva</i> Ball | |

Group of Tephritidae (non-EU) such as:

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

(c) Viruses and virus-like organisms

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

- | | |
|----------------------------------|--|
| 1) Andean potato latent virus | 4) Potato black ringspot virus |
| 2) Andean potato mottle virus | 5) Potato virus T |
| 3) Arracacha virus B, oca strain | 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 | 8) Peach yellows mycoplasma |
| 2) Cherry rasp leaf virus (American) | 9) Plum line pattern virus (American) |
| 3) Peach mosaic virus (American) | 10) Raspberry leaf curl virus (American) |
| 4) Peach phony rickettsia | 11) Strawberry witches' broom mycoplasma |
| 5) Peach rosette mosaic virus | 12) Non-EU viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L. |
| 6) Peach rosette mycoplasma | |
| 7) Peach X-disease mycoplasma | |

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

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

(b) Fungi

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

(c) Viruses and virus-like organisms

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

(d) Parasitic plants

Arceuthobium spp. (non-EU)

Annex I A I I

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

Meloidogyne fallax Karssen

Rhizoecus hibisci Kawai and Takagi

Popillia japonica Newman

(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

Scaphoideus luteolus 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 or those of a regulated non-quarantine pest for the area of the European Union (EU) excluding Ceuta, Melilla and the outermost regions of Member States (MS) referred to in Article 355(1) of the Treaty on the Functioning of the European Union (TFEU), other than Madeira and the Azores.

2. Data and methodologies

2.1. Data

2.1.1. Literature search

A literature search on *S. luteolus* 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 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

Pest information, on host(s) and distribution, was retrieved from the European and Mediterranean Plant Protection Organization (EPPO) Global Database (EPPO, 2018) and relevant publications.

The Europhyt database was 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, 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 MS and the phytosanitary measures taken to eradicate or avoid their spread.

2.2. Methodologies

The Panel performed the pest categorisation for *S. luteolus*, following guiding principles and steps presented in the European Food Safety Authority (EFSA) guidance on quantitative pest risk assessment (EFSA PLH Panel (2018) and in the International Standard for Phytosanitary Measures (ISPM) No 11 (FAO, 2013) and No 21 (FAO, 2004).

This work was initiated following an evaluation of the EU 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 quarantine pest and for a Union regulated non-quarantine pest in accordance with Regulation (EU) 2016/2031 on protective measures against pests of plants, and includes additional information required in accordance with the specific ToR 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 potentially qualify either as a quarantine pest or as a regulated non-quarantine pest. If one of the criteria is not met, the pest will not qualify. A pest that does not qualify as a quarantine pest may still qualify as a regulated non-quarantine pest that needs to be addressed in the opinion. For the pests regulated in the protected zones only, the scope of the categorisation is the territory of the protected zone; thus, the criteria refer to the protected zone instead of the EU territory.

It should be noted that 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, 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, whereas addressing social impacts is outside the remit of the Panel.

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 protected zone quarantine pest (articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
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 protected zone quarantine organism	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)
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	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 risk assessment area (i.e. protected zone)	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?

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
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 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?	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!
Potential for consequences in the EU territory (Section 3.5)	Would the pests' introduction have an economic or environmental impact on the EU territory?	Would the pests' introduction have an economic or environmental impact on the protected zone areas?	Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?
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 the entry into, establishment within or spread of the pest within the protected zone areas such that the risk becomes mitigated? Is it possible to eradicate the pest in a restricted area within 24 months (or a period longer than 24 months where the biology of the organism so justifies) after the presence of the pest was confirmed in the protected zone?	Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?
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	A statement as to whether (1) all criteria assessed by EFSA above for consideration as potential protected zone quarantine pest were met, and (2) if not, which one(s) were not met	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential regulated non-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, *Scaphoideus luteolus* is a clearly defined insect species in the order Hemiptera, family Cicadellidae.

S. luteolus Van Duzee 1894 (Hemiptera, Cicadellidae) is a well-described insect species with stable taxonomy. The taxonomy of the genus *Scaphoideus* was thoroughly revised by Barnett (1976).

3.1.2. Biology of the pest

There is not much information about the biology of the species. As a leafhopper, it has three developmental stages (egg, nymph, adult). It has been reported to overwinter in the egg stage laid in the cork parenchyma. Eggs hatch soon after foliage appearance in spring. The nymphal stage has been reported to take 36–42 days to complete. Adults are found throughout the summer period. *S. luteolus* is the only confirmed vector of *Candidatus* Phytoplasma ulmi (CPu), in North America. Both nymphs and adults are capable of transmitting CPu. It requires a period of 3 weeks after feeding on infected plants before they are capable of transmitting the disease. After that period, they remain infective for the rest of their life (Sinclair et al., 1976).

3.1.3. Intraspecific diversity

No intraspecific diversity has been described for this species.

3.1.4. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes, detection is possible using standard techniques in entomology, e.g. yellow sticky traps to capture adults. There is a detailed description and a key available for the identification of the species.

Barnett (1976) provides a detailed key and description for the identification of the species using male genitalia. *S. luteolus* is also unique within the genus as both males and females have a golden appearance of forewings and body and vivid red eyes with a longitudinal white stripe. Even very old museum specimens keep the vivid red eye character.

Yellow sticky traps have been used for surveying of leafhoppers on elm trees in the USA (Bentz and Townsend, 2005).

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

S. luteolus is present only in the eastern part of the USA (Figure 1).

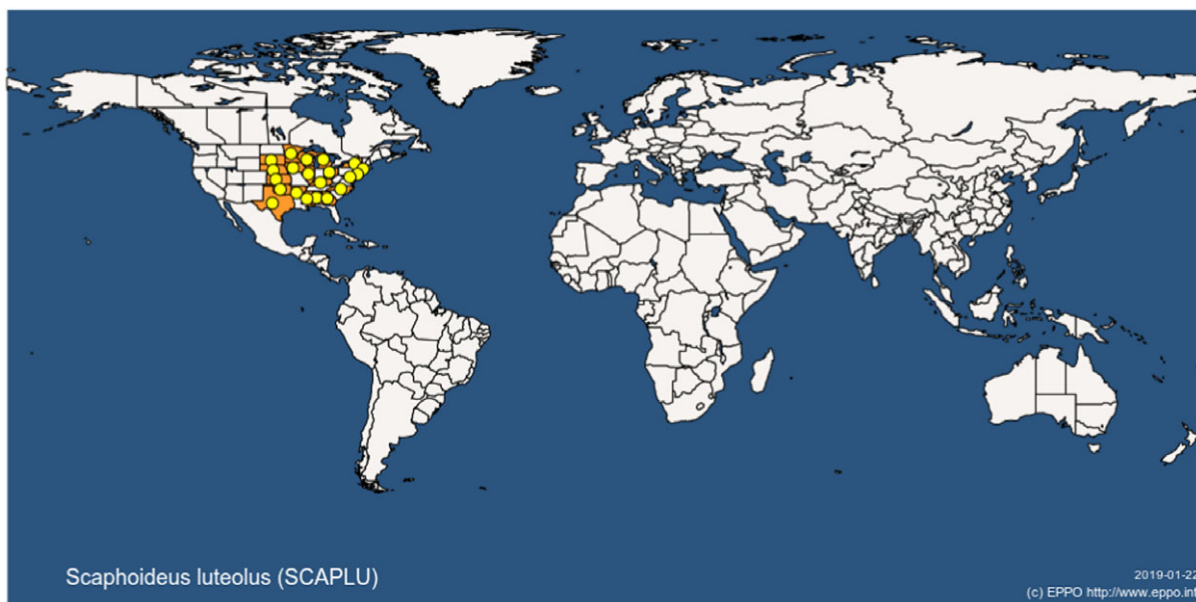


Figure 1: Global distribution map for *Scaphoideus luteolus* (extracted from the EPPO Global Database accessed on 22 January 2019)

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?

No, *Scaphoideus luteolus* has not been reported from the EU.

3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

S. luteolus is listed in Council Directive 2000/29/EC. Details are presented in Tables 2 and 3.

Table 2: *Scaphoideus luteolus* in Council Directive 2000/29/EC

Annex I, Part A	Harmful organisms whose introduction into, and spread within, all member states shall be banned
Section I	Harmful organisms not known to occur in any part of the community and relevant for the entire community
(a)	Insects, mites and nematodes, at all stages of their development
	Species
20.	<i>Scaphoideus luteolus</i> (Van Duzee)

3.3.2. Legislation addressing the hosts of *Scaphoideus luteolus*

Scaphoideus luteolus is listed on Annex IAI; therefore, its introduction into, and spread within, the EU is banned on all plant genera and commodities.

Table 3: Regulated hosts and commodities that may involve *Scaphoideus luteolus* 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
3.	Plants of <i>Populus</i> L., with leaves, other than fruit and seeds	North American countries
15.	Plants of <i>Vitis</i> L., other than fruits	Third countries other than Switzerland
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
2.3.	Whether or not listed among CN codes in Annex V, Part B, wood of [...] <i>Ulmus davidiana</i> Planch. [...], other than in the form of — chips, particles, sawdust, shavings, wood waste and scrap, obtained in whole or part from these trees, — wood packaging material, in the form of packing cases, boxes, crates, drums and similar packings, pallets, box pallets and other load boards, pallet collars, dunnage, whether or not actually in use in the transport of objects of all kinds, except dunnage supporting consignments of wood, which is constructed from wood of the same type and quality as the wood in the consignment and which meets the same Union phytosanitary requirements as the wood in the consignment, but including wood which has not kept its natural round surface, and furniture and other objects	Official statement that: (a) the wood originates in an area recognised as being free from <i>Agrilus planipennis</i> Fairmaire in accordance with the procedure referred to in Article 18(2). The name of the area shall be mentioned on the certificates referred to in Article 13.1.(ii), or (b) the bark and at least 2.5 cm of the outer sapwood are removed in a facility authorised and supervised by the national plant protection organisation, or (c) the wood has undergone ionizing irradiation to achieve a minimum

	made of untreated wood, originating in Canada, China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, Russia, Taiwan and USA	absorbed dose of 1 kGy throughout the wood.
2.4.	Whether or not listed among CN codes in Annex V, Part B, wood in the form of chips, particles, sawdust, shavings, wood waste and scrap obtained in whole or in part from [...] <i>Ulmus davidiana</i> Planch. [...] originating in Canada, China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, Russia, Taiwan and USA	Official statement that the wood originates in an area recognised as being free from <i>Agrilus planipennis</i> Fairmaire in accordance with the procedure referred to in Article 18(2). The name of the area shall be mentioned on the certificates referred to in Article 13.1.(ii).
11.4.	Plants of [...] <i>Ulmus davidiana</i> Planch. [...] other than fruit and seeds, but including cut branches with or without foliage, originating in Canada, China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, Russia, Taiwan and USA	Official statement that the plants originate in an area recognised as being free from <i>Agrilus planipennis</i> Fairmaire in accordance with the procedure referred to in Article 18(2). The name of the area shall be mentioned on the certificates referred to in Article 13.1.(ii).
14.	Plants of <i>Ulmus</i> L., intended for planting, other than seeds, originating in North American countries	Without prejudice to the provisions applicable to the plants in Annex IV(A)(I) (11.4), official statement that no symptoms of ' <i>Candidatus</i> Phytoplasma ulmi' have been observed at the place of production or in its immediate vicinity since the beginning of the last complete cycle of vegetation.
Section II	Plants, plant products and other objects originating in the community	
	Plants, plant products and other objects	Special requirements
8.1.	Plants of <i>Ulmus</i> L., intended for planting, other than seeds	Official statement that no symptoms of ' <i>Candidatus</i> Phytoplasma ulmi' have been observed at the place of production or in its immediate vicinity since the beginning of the last complete cycle of vegetation.
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 A	Plants, plant products and other objects originating in the Community	
Section I	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community and which must be accompanied by a plant passport	
2.1.	Plants intended for planting, other than seeds, of the genera [...] <i>Ulmus</i> L., [...] intended for planting, and other than bulbs, corms, rhizomes, seeds and tubers.	
Section II	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for certain protected zones, and which must be accompanied by a plant passport valid for the appropriate zone when introduced into or moved within that zone	
1.2.	Plants intended for planting, other than seeds, of [...] <i>Ulmus</i> L.	
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	
2.	Parts of plants, other than fruits and seeds, of: Cut branches of [...] <i>Ulmus davidiana</i> Planch. [...] with or without foliage, originating in Canada, China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, Russia, Taiwan and USA,	
6.	Wood within the meaning of the first subparagraph of Article 2(2), where it: (a) has been obtained in whole or part from one of the order, genera or species as described hereafter, except wood packaging material defined in Annex IV, Part A, Section I, Point 2: — [...] <i>Ulmus davidiana</i> Planch. [...] including wood which has not kept its natural round surface, originating in Canada, China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, Russia, Taiwan and USA	

3.3.3. Legislation addressing the organisms vectored by *Scaphoideus luteolus* (Directive 2000/29/EC)

Annex I, Part A	Harmful organisms whose introduction into, and spread within, all member states shall be banned
Section II	Harmful organisms known to occur in the community and relevant for the entire community
(d)	Viruses and virus-like organisms
	Species
2.1.	' <i>Candidatus</i> Phytoplasma ulmi'

3.4. Entry, establishment and spread in the EU

3.4.1. Host range

The main host plants of *Scaphoideus luteolus* are species of the genus *Ulmus*. It has been reported from *Ulmus americana*, *Ulmus alata*, *Ulmus bergmanianna*, *Ulmus szechuanica*, *Ulmus rubra* (Bentz and Townsend, 2005; CABI 2018). Barnett (1976) mentions that specimens of the species were collected on *Vitis* spp., *Salix* spp. and *Populus* spp. It has also been reported from other unidentified herbaceous plants (Barnett, 1977).

3.4.2. Entry

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

Yes, through plants for planting and cut branches.

There are no records of interception of *Scaphoideus luteolus* in the Europhyt database. The main pathways for entry are:

- Plants for planting of *Ulmus*, *Vitis*, *Salix* and *Populus*
- Cut branches of *Ulmus*, *Vitis*, *Salix* and *Populus*

These pathways are not regulated for the main host, *Ulmus*, though Annex IV requirements are in place in relation to other pests on *Ulmus* (see Table 3 in Section 3.3.2). They are also not regulated for *Salix*.⁴

Specific import requirements are currently specified in Annex III or Annex IV of 2000/29/EC for:

- Plants (with leaves) of *Populus* (prohibited Annex III A.3)
- Plants of *Vitis* (prohibited Annex III A.15)

In the ISEFOR database on plants for planting (Eschen et al., 2017), there are records of imports of *Ulmus* plants for planting from the USA into the EU in 2007–2012 and 2014.

3.4.3. Establishment

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

Yes, host plants are available throughout EU and climatic conditions in parts of EU are similar to the places of origin of *S. luteolus*.

3.4.3.1. EU distribution of main host plants

Host plants of *S. luteolus* (see Section 3.4.1) are widely distributed throughout the EU territory.

⁴ *Ulmus*, *Salix* and *Populus* are listed on Annex I of the Commission Implementing Regulation (EU) 2018/2019 of 18 December 2018 establishing a provisional list of high-risk plants, plant products or other objects, within the meaning of Article 42 of Regulation (EU) 2016/2031 and a list of plants for which phytosanitary certificates are not required for introduction into the Union, within the meaning of Article 73 of that Regulation.

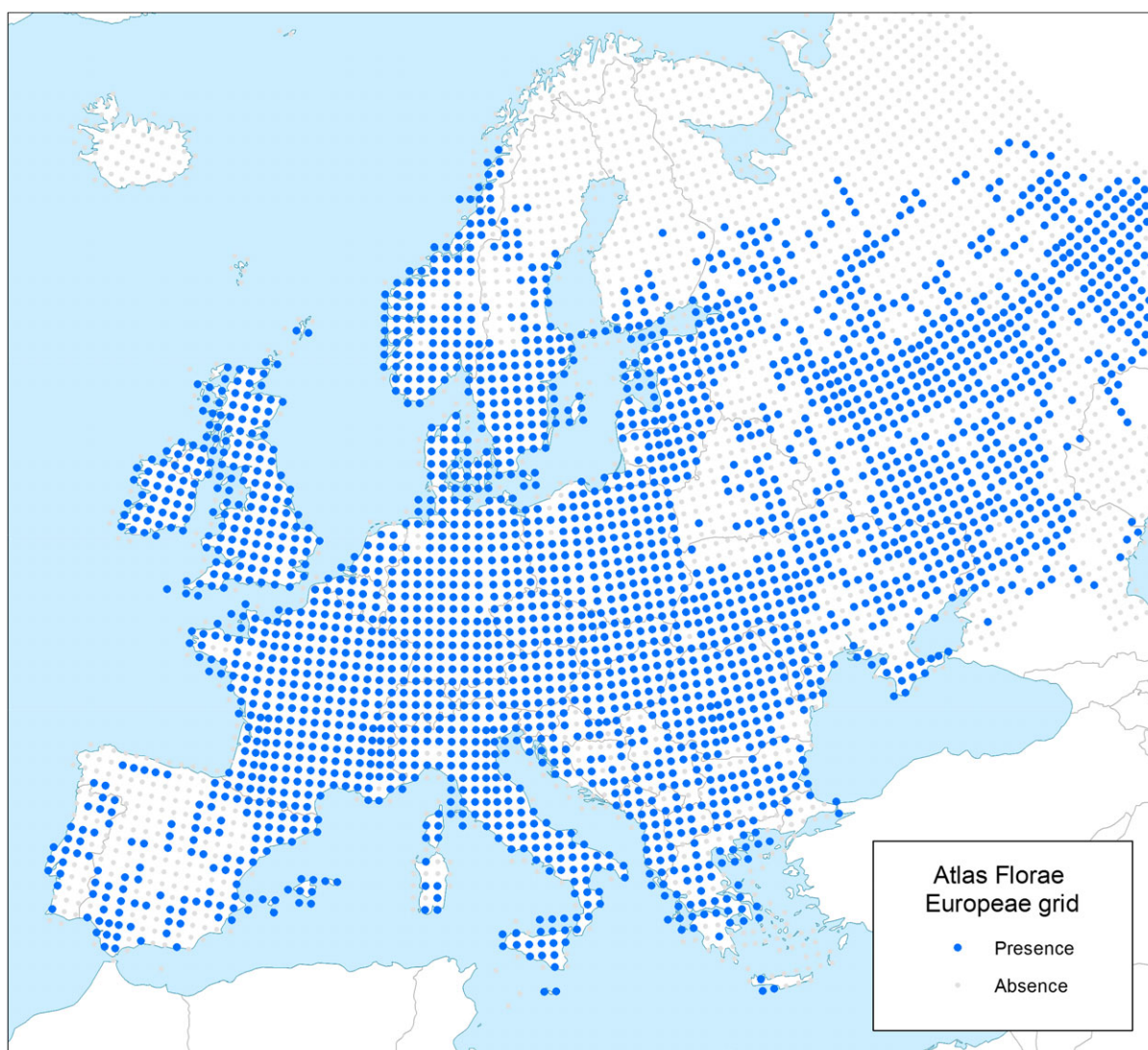


Figure 2: Distribution of the genus *Ulmus* according to Atlas Florae Europaeae (Jalas and Suominen, 1976). The map considers the following species: *Ulmus glabra*, *U. minor*, *U. laevis*. It indicates where at least one of them is recorded in a 50 × 50 km grid in a UTM projection. The map is the result of the presence records inside the UTM grid 50 × 50 km of at least one of the considered species

3.4.3.2. Climatic conditions affecting establishment

S.luteolus occurs in the eastern USA in Köppen–Geiger climate zones Cfa (humid, subtropical), Cfb (temperate oceanic) and Dfb (continental, uniform precipitation, warm summer) (Kottek et al., 2006). These climate types also occur over much of the EU (MacLeod and Koryconska, 2019).

Therefore, climatic suitability is not expected to limit its establishment in EU.

3.4.4. Spread

Is the pest able to spread within the EU territory following establishment? How?

Yes, the pest is able to spread in the EU by flight and using the pathways listed in Section 3.4.2.

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

Yes, plants for planting is the main mean for spread for *S. luteolus*.

Adults of *S. luteolus* are capable of limited flight. Adult flight is not considered the main way for long distance dispersal. Plants for planting bearing eggs are considered the main source of long distance spread (CABI, 2018).

3.5. Impacts

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

Yes, because it vectors the Elm phloem necrosis mycoplasma, *Candidatus Phytoplasma ulmi* (CPu). It is not considered as a pest on its own.

*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?*⁵

Yes, because plants for planting of *Ulmus* spp. are the main pathway for *S. luteolus*.

The pest has no documented direct impact on its host plants and is absent from the EU (see Section 3.2.2). However, the phytoplasma it vectors, *Candidatus Phytoplasma ulmi* a quarantine pathogen listed on Annex I AII of Council Directive 2000/29, reported from North America, is present in at least seven EU MS: Belgium, Croatia, Czech Republic, France, Germany, Italy and Slovenia (EPPO, 2018) and it is a severe disease of *Ulmus* trees. The introduction of *S. luteolus* in the EU will facilitate the establishment and spread of American strains of *Candidatus Phytoplasma ulmi* within EU (CABI 2018).

To quote the EFSA PLH Panel in relation to the impacts of CPu (2014): 'CPu affects elm trees by limiting phloem translocation, producing visible leaf yellowing and epinasty symptoms. In some cases, witches' brooms appear. The disease is linked to phloem degeneration in the roots and base of the tree, followed by root mortality, then tree mortality. Death of the tree might occur rapidly (within three successive years).

In the USA, several epidemics have been reported, in Ohio, Illinois, Pennsylvania (Merril and Nichols, 1972) and New York (Lanier and Manion, 1988). In New York, approximately 58% of elms were lost between 1981 and 1984 (Lanier and Manion, 1988). Similarly, Carter and Carter (1974) compared the effect of Dutch elm disease and phloem necrosis in Illinois (USA) between 1944 and 1972. They found that 21% of the elm trees in the area disappeared as a result of CPu.

(...)

The disease has been reported from several regions in Italy and France, from Germany and the Czech Republic (...), but usually from areas considered as restricted. Since no extensive surveys are reported, it is not possible to assess the overall presence of CPu in Europe. Elm species in Europe (*Ulmus minor*, *Ulmus campestris*, *Ulmus laevis*, *Ulmus chenmoui* and others) are usually considered as less susceptible to *Candidatus Phytoplasma ulmi*. The type of symptoms reported (witches' brooms, yellowing) is associated with decline but less often with plant mortality, despite some epidemic foci reports. This is why it was hypothesised that the disease originated from Europe (Boudon-Padiou et al., 2004).'

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, see section 3.3.

RNQPs: Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?

Yes, pest free area or place of production would mitigate the risk in case the pest entered.

3.6.1. Identification of additional measures

Phytosanitary measures are currently applied to plants for planting of *Populus* spp. and *Vitis* spp. (see Section 3.3).

⁵ See Section 2.1 on what falls outside EFSA's remit.

3.6.1.1. Additional control measures

Potential additional control measures are listed in Table 4.

Table 4: 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

Information sheet title (with hyperlink to information sheet if available)	Control measure summary	Risk component (entry/establishment/spread/impact)
Growing plants in isolation	Description of possible exclusion conditions that could be implemented to isolate the crop from pests and if applicable relevant vectors. E.g. a dedicated structure such as glass or plastic greenhouses	Entry
Chemical treatments on consignments or during processing	Use of chemical compounds that may be applied to plants or to plant products after harvest, during process or packaging operations and storage The treatments addressed in this information sheet are: a) fumigation; b) spraying/dipping pesticides; c) surface disinfectants; d) process additives; e) protective compounds	Entry and spread
Roguing and pruning	Roguing is defined as the removal of infested plants and/or uninfested host plants in a delimited area, whereas pruning is defined as the removal of infested plant parts only, without affecting the viability of the plant	Establishment and spread
Heat and cold treatments	Controlled temperature treatments aimed to kill or inactivate pests without causing any unacceptable prejudice to the treated material itself. The measures addressed in this information sheet are: autoclaving; steam; hot water; hot air; cold treatment	Entry and spread

3.6.1.2. Additional supporting measures

Potential additional supporting measures are listed in Table 5.

Table 5: 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

Information sheet title (with hyperlink to information sheet if available)	Supporting measure summary	Risk component (entry/establishment/spread/impact)
Inspection and trapping	Inspection is defined as the official visual examination of plants, plant products or other regulated articles to determine if pests are present or to determine compliance with phytosanitary regulations (ISPM 5) The effectiveness of sampling and subsequent inspection to detect pests may be enhanced by including trapping and luring techniques	Entry
Laboratory testing	Examination, other than visual, to determine if pests are present using official diagnostic protocols. Diagnostic protocols describe the minimum requirements for reliable diagnosis of regulated pests	Entry
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	Entry

Information sheet title (with hyperlink to information sheet if available)	Supporting measure summary	Risk component (entry/establishment/spread/impact)
	consignments. It can be a part of a larger system maintained by a National Plant Protection Organization 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	
Sampling	According to ISPM 31, it is usually not feasible to inspect entire consignments, so phytosanitary inspection is performed mainly on samples obtained from a consignment. It is noted that the sampling concepts presented in this standard may also apply to other phytosanitary procedures, notably selection of units for testing For inspection, testing and/or surveillance purposes the sample may be taken according to a statistically based or a non-statistical sampling methodology	Entry
Phytosanitary certificate and plant passport	An official paper document or its official electronic equivalent, consistent with the model certificates of the IPPC, attesting that a consignment meets phytosanitary import requirements (ISPM 5) a) export certificate (import) b) plant passport (EU internal trade)	Entry and spread

3.6.1.3. Biological or technical factors limiting the effectiveness of measures to prevent the entry, establishment and spread of the pest

- The insects might be able to travel as hitchhikers.

3.7. Uncertainty

- The harmfulness towards European elms of the North American strains of *Candidatus Phytoplasma ulmi*, that could be vectored by *S. luteolus*, is unknown.
- The capacity of *S. luteolus* to vector the European strains of *Candidatus Phytoplasma ulmi* is unknown.
- The capacity of *S. luteolus* to travel as a hitchhiker is unknown.
- Although *S. luteolus* has been described as capable of only short distance flight (CABI, 2018), flight capacity has never been measured.
- Specimens of the insects have been found on *Vitis* sp., *Salix* sp. and *Populus* sp.; however, no additional information is available regarding the host status of these genera.
- The possibility of heat treatment of *Ulmus* and *Populus* plants for planting has so far not been practically considered.

4. Conclusions

S. luteolus meets all criteria assessed by EFSA above for consideration as a potential quarantine pest. *S. luteolus* does not meet all criteria assessed by EFSA above for consideration as a potential regulated non-quarantine pest as it is not present in EU (Table 6).

Table 6: 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)	<i>Scaphoideus luteolus</i> is a clearly defined insect species	<i>Scaphoideus luteolus</i> is a clearly defined insect species	None
Absence/presence of the pest in the EU territory (Section 3.2)	The pest is absent in the EU territory. It is present only in the USA	The pest is absent in the EU territory. It is present only in the USA	None
Regulatory status (Section 3.3)	The pest is listed on Annex IAI of Council Directive 2000/29/EC	The pest is listed on Annex IAI of Council Directive 2000/29/EC	None
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	<i>S. luteolus</i> has the potential to enter in cut branches and plants for planting, become established and spread within the EU	Spread is mainly via specific plants for planting	The capacity of <i>S. luteolus</i> to travel as a hitchhiker is unknown. Although <i>S. luteolus</i> has been described as capable of only short distance flight (CABI, 2018), flight capacity has never been measured.
Potential for consequences in the EU territory (Section 3.5)	The pest has no documented direct impact on its host plants, but it vectors the Elm phloem necrosis mycoplasma, <i>Candidatus</i> Phytoplasma ulmi (CPu) that causes severe disease of elms	The pest has no documented direct impact on its host plants, but it vectors the Elm phloem necrosis mycoplasma, <i>Candidatus</i> Phytoplasma ulmi (CPu) that causes severe disease of elms	The harmfulness towards European elms of the North American strains of <i>Candidatus</i> Phytoplasma ulmi, that could be vectored by <i>S. luteolus</i> , is unknown. The capacity of <i>S. luteolus</i> to vector the European strains of <i>Candidatus</i> Phytoplasma ulmi is unknown.
Available measures (Section 3.6)	There are measures available to prevent the entry of <i>S. luteolus</i> in the EU, which are described in Council Directive 2000/29/EC and in Section 3.6	Growing of plants in pest-free area or place of production	None
Conclusion on pest categorisation (Section 4)	<i>S. luteolus</i> meets all criteria assessed by EFSA above for consideration as a potential quarantine pest	<i>S. luteolus</i> does not meet all criteria assessed by EFSA above for consideration as a potential regulated non-quarantine pest as it is not present in EU	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The potential of the species as vector of European strains of <i>Candidatus</i> Phytoplasma ulmi		

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Abbreviations

CPu	<i>Candidatus</i> Phytoplasma ulmi
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
RNQP	Regulated Non-quarantine pest
TFEU	Treaty on the Functioning of the European Union
ToR	Terms of Reference

Glossary

Containment (of a pest)	Application of phytosanitary measures in and around an infested area to prevent spread of a pest (FAO, 1995, 2017)
Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 1995, 2017)
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, 2017)
Eradication (of a pest)	Application of phytosanitary measures to eliminate a pest from an area (FAO, 2017)
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2017)
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, 2017)
Measures	Control (of a pest) is defined in ISPM 5 (FAO 2017) as 'Suppression, containment or eradication of a pest population' (FAO, 1995). Control measures are measures that have a direct effect on pest abundance. Supporting measures are organisational measures or procedures supporting the choice of appropriate Risk Reduction Options that do not directly affect pest abundance.
Pathway	Any means that allows the entry or spread of a pest (FAO, 2017)
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, 2017)
Protected zones (PZ)	A protected zone is an area recognised at EU level to be free from a harmful organism, which is established in one or more other parts of the Union.
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, 2017)
Regulated non-quarantine pest	A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party (FAO, 2017)
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, 2017)