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Pest categorisation of *Resseliella citrifrugis*

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Abstract

The EFSA Panel on Plant Health performed a pest categorisation of the citrus fruit midge, *Resseliella citrifrugis* Jiang (Diptera: Cecidomyiidae), for the territory of the EU. This species is not included in EU Commission Implementing Regulation 2019/2072. This oligophagous species, which feeds on *Citrus* spp. fruits, is known to occur in China (provinces of Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi and Sichuan). First-generation adults emerge in April and oviposit on the peduncle and calyx of citrus fruits. Larvae feed on the albedo (the white layer between skin and pulp) of the fruit, which they tunnel. Infested fruit most often drop prematurely. Larvae pupate either within the fallen fruit or in the soil. This species has three main peaks of activity (May, June–July, August–September) and four generations per year in its native range. Mature larvae from the last generation are the overwintering stage. Potential entry pathways for *R. citrifrugis*, such as *Citrus* spp. plants for planting with foliage and soil/growing media, and soil/growing media can be considered as closed. The citrus fruit pathway remains open from countries where *R. citrifrugis* is known to occur. Indeed, this species was intercepted in fresh pomelos 11 times from December 2020 to January 2021 in the EU. Should *R. citrifrugis* enter the EU, the ample availability of hosts (*Citrus* spp.) and the climatic conditions in citrus-growing areas of southern EU Member States would most probably allow this species to successfully establish and spread. Economic impact in citrus production is anticipated if establishment occurs. *R. citrifrugis* satisfies the criteria that are within the remit of EFSA to assess for this species to be regarded as a potential Union quarantine pest. There is uncertainty about the nomenclature of *R. citrifrugis* and its exact host range. However, because the name *Resseliella citrifrugis* is used in multiple sources reporting it as a pest of citrus in China, where symptoms, biology and impact are described, these uncertainties do not affect the conclusions of this categorisation.

Keywords: citrus fruit midge, Cecidomyiidae, Diptera, pest risk, plant health, plant pest, quarantine

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Table of contents

Abstract 1
1. Introduction 4
1.1. Background and Terms of Reference as provided by the requestor 4
1.1.1. Background 4
1.1.2. Terms of reference 4
1.2. Interpretation of the Terms of Reference 4
1.3. Additional information 5
2. Data and methodologies 5
2.1. Data 5
2.1.1. Literature search 5
2.1.2. Database search 5
2.2. Methodologies 5
3. Pest categorisation 6
3.1. Identity and biology of the pest 6
3.1.1. Identity and taxonomy 6
3.1.2. Biology of the pest 7
3.1.3. Host range 7
3.1.4. Intraspecific diversity 7
3.1.5. Detection and identification of the pest 7
3.2. Pest distribution 8
3.2.1. Pest distribution outside the EU 8
3.2.2. Pest distribution in the EU 9
3.3. Regulatory status 9
3.3.1. Commission Implementing Regulation 2019/2072 9
3.3.2. Hosts of *R. citrifrugis* that are prohibited from entering the Union from third countries 9
3.4. Entry, establishment and spread in the EU 9
3.4.1. Entry 9
3.4.2. Establishment 11
3.4.2.1. EU distribution of main host plants 11
3.4.2.2. Climatic conditions affecting establishment 12
3.4.3. Spread 13
3.5. Impacts 13
3.6. Available measures and/or potential specific import requirements and limits of mitigation measures 13
3.6.1. Identification of potential additional measures 13
3.6.1.1. Biological or technical factors limiting the effectiveness of measures to prevent the entry of the pest 14
3.7. Uncertainty 14
4. Conclusions 14
References 15
Abbreviations 16
Glossary 16
Appendix A – EU 27 Imports of citrus fruit (in 100 Kg) from countries where *R. citrifrugis* is known to occur (China) 18
Appendix B – Distribution of *Resseliella citrifrugis* 19

1. Introduction

1.1. Background and Terms of Reference as provided by the requestor

1.1.1. Background

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

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

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

1.1.2. Terms of Reference

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

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

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

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

1.2. Interpretation of the Terms of Reference

Resseliella citrifrugis is one of a number of pests listed in Annex 1 to the Terms of Reference (ToR) (Section 1.1.2.1) to be subject to pest categorisation to determine whether it fulfils the criteria of a regulated pest for the area of the EU excluding Ceuta, Melilla and the outermost regions of Member States referred to in Article 355(1) of the Treaty on the Functioning of the European Union (TFEU), other than Madeira and the Azores, and so inform European Commission decision-making as to its appropriateness for potential inclusion in the lists of pests of Commission Implementing Regulation (EU) 2019/2072. If a pest fulfils the criteria to be potentially listed as a union quarantine pest, specific import requirements for relevant host commodities will be identified; for pests already present in the EU, additional risk reduction options to slow spread and facilitate eradication will be identified.

1.3. Additional information

This pest categorisation was initiated following interceptions (see Section 3.4.1).

2. Data and methodologies

2.1. Data

2.1.1. Literature search

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

2.1.2. Database search

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

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

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

2.2. Methodologies

The Panel performed the pest categorisation for *Resseliella citrifrugis,* following guiding principles and steps presented in the EFSA guidance on quantitative pest risk assessment (EFSA PLH Panel, 2018), the EFSA guidance on the use of the weight of evidence approach in scientific assessments (EFSA Scientific Committee, 2017) and the International Standards for Phytosanitary Measures No. 11 (FAO, 2013) and No. 21 (FAO, 2004).

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

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

Table 1: Pest categorisation criteria under evaluation, as 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 (article 3)
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?
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
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.
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
Potential for consequences in the EU territory (Section 3.5)	Would the pests' introduction have an economic or environmental impact on the EU territory?
Available measures (Specific import requirements) (Section 3.6)	Are there measures available to prevent the entry into the EU such that the likelihood of introduction 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.

3. Pest categorisation

3.1. Identity and biology of the pest

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

Yes. Although the identity of *R. citrifrugis* has not been properly established (it is considered a *nomen nudum*, i.e. a term applied to species not adequately described yet), this scientific name has been profusely used to report a pestiferous midge producing consistent symptoms in *Citrus* spp. fruits in China.

3.1.1. Identity and taxonomy

The citrus fruit midge, *Resseliella citrifrugis* Jiang (1994) (Diptera: Cecidomyiidae) is a small dipteran species. *R. citrifrugis* was listed by Gagné (2010) in his World catalogue of Cecidomyiidae under the title 'Cecidomyiidae *nomina nuda* and invalid species'. *Nomen nudum* is a Latin term used for a species name which is not linked to a proper description of that species. The International Commission on Zoological Nomenclature (ICZN) states that for a new species name to be valid, when published after 1930, it 'must be accompanied by a description or definition that states in words characters that are purported to differentiate the taxon, or be accompanied by a bibliographic reference to such a published statement' (ICZN, 2014). Because the name *Resseliella citrifrugis* is used in multiple sources reporting it as a pest of citrus in China, where morphology, symptoms and biology are described (see Sections 3.1.2 and 3.1.4), the categorisation has been performed despite this nomenclatural uncertainty.

The EPPO code[1] for this species is: RESSCI (EPPO, online).

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

3.1.2. Biology of the pest

The biology of *R. citrifrugis* has been studied in China, with most literature published in Chinese (see references in Table 2). *Citrus* spp. is the only reported host for this species. *R. citrifrugis* has four generations per year in Hunan (Huang et al., 2001).

Table 2: Important features of the life-history strategy of *Resseliella citrifrugis*

Life stage	Phenology and relation to host	Other relevant information
Egg	Adults lay eggs on the peduncle and calyx (Yang, 2010) or inside the albedo (pith) of the fruit (Cai and Peng, 2008).	The percentage of fruit infested in groves ranges from 10 to 70 (Huang et al., 2001; Lu, 2002; Yang, 2010).
Larva	Upon hatching, larvae burrow forming tunnels in the albedo (Yang, 2010). There are four larval instars (Huang et al., 2001). Several larvae may be found in one single fruit (Huang et al., 2001). Mature larvae within fallen fruit may either stay or leave it to pupate either in the fruit or in the soil, respectively. Larvae are most active/damaging from mid-June to early August (Lu, 2002), sometimes extending to early October (Wu et al., 1999). Last instar larvae of the autumn generation overwinter either in the fruit or in the soil. Overwintering extends from mid-December until April (Wu et al., 1999; Huang et al., 2001).	Larval development takes from 22 to 46 days for first to third generations but from 175 to 206 days for the fourth overwintering generation (Huang et al., 2001). A temperature of 2°C for 12 days is lethal for fourth instar larvae within pomelo fruits (Chen and Hou, 2010).
Pupa	Pupation occurs either in the fruit or in the soil, usually at a depth of 2–5 cm (Huang et al., 2001).	Pupal development takes from 7 to 19 days (Huang et al., 2001).
Adult	Adults of first generation emerge around April. Emergence takes place from 20:00 to 23:00 h. Male adults live for 1–2 days and females for 2–4 days (Huang et al., 2001).	Fecundity is 50–100 eggs per female (Huang et al., 2001). Adults may disperse 10–15 m mostly aided by air currents (Huang et al., 2001).

3.1.3. Host range

R. citrifrugis is an oligophagous species feeding on Rutaceae of the genus *Citrus* spp. (Lu, 2002; GAQSIQ, 2011), such as pomelo (*Citrus maxima*) and grapefruit (*Citrus paradisi*) (Lu, 2002; Cai and Peng, 2008; Chen and Hou, 2010; Yang, 2010; USDA, 2020). Huang et al. (2001) mention mandarins/oranges as additional hosts. However, because the scientific names of these hosts are not provided in their Chinese text, there is uncertainty about the exact host status of mandarins and oranges.

3.1.4. Intraspecific diversity

There are no reports of intraspecific variation for *R. citrifrugis*.

3.1.5. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes, there are detection and identification methods for *R. citrifrugis.*

Detection

Chen (2011) studied the attraction of *R. citrifrugis* to the essential oils of different *Citrus* species. Although differences were observed, this research did not result in the development of a trap that could be used to detect and/or monitor this species.

Symptoms

Infestation can cause obvious symptoms on fruit, including dark colour of entrance hole and liquid exuding from the site, uneven yellow and brown spots on outer layer, deformed fruit and rotting (Cai and Peng, 2008; Yang, 2010).

Identification

Huang et al. (2001) provide a description of the different life stages of *R. citrifrugis*. Although important details for taxonomy of Cecidomyiidae are included (i.e. thorax and abdomen colour, morphology of eyes and ocelli, palpus and male genitalia, wing venation) (Figure 1), this is not considered a proper description according to international standards (ICZN, 2014) (see Section 3.1.1).

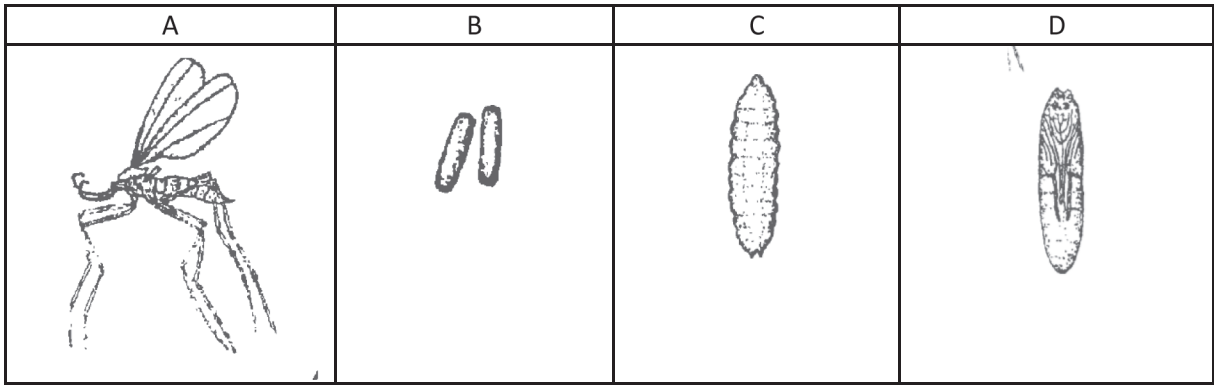

Figure 1: *Resseliella citrifrugis* morphology (from Wu et al., 1999). A. Adult; B. Eggs; C. larva; D. pupa (for actual size, refer to information below) from Wu et al., 1999

Description

Based on Huang et al. (2001):

- Adult: 3.1–3.8 mm long; wingspan 4.55–5.54 mm,
- Egg: 0.31–0.43 mm long; whitish,
- Larva: LI 0.3–1.5 mm long, whitish; LII 1.3–2.5 mm long, milkish white; LIII 2.4–3.5 mm long, reddish yellow; LIV 3.3–3.9 mm long, reddish brown,
- Pupa: 2.5–3 mm long, in a brownish silken cocoon.

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

R. citrifrugis occurs in the Chinese provinces of Fujian (Chen and Hou, 2010), SE Gansu (Xie et al., 2012), Hubei (Lu and Wang, 2004), Hunan (Huang et al., 2001; Lu, 2002), Guangdong (Wu et al., 1999), Guangxi (Yang, 2010), Guizhou (Lu and Wang, 2004), Jiangxi (Xie et al., 2012) and Sichuan (Xie et al., 2012).

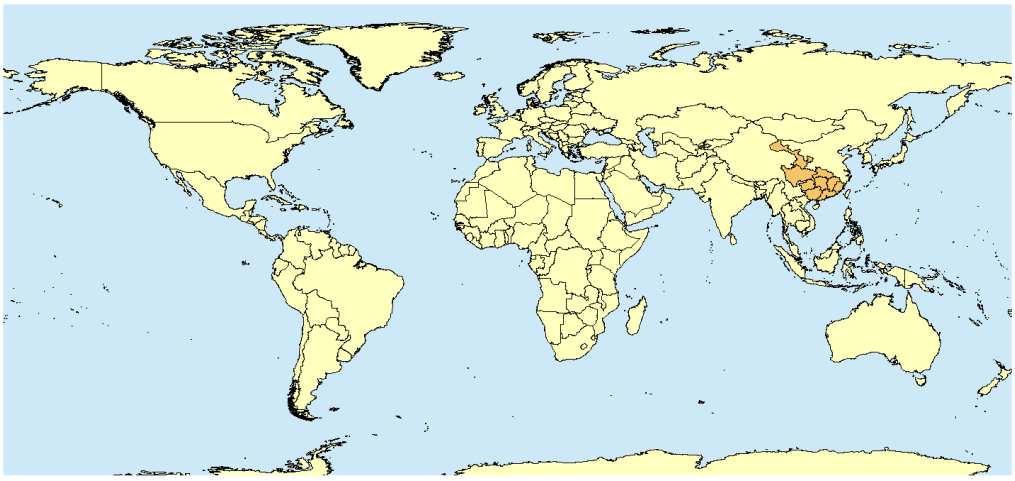

Figure 2: Global distribution of *Resseliella citrifrugis* (Source: literature)

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. *R. citrifrugis* is not known to occur in the EU.

3.3. Regulatory status

3.3.1. Commission Implementing Regulation 2019/2072

R. citrifrugis is not listed in Annex II of Commission Implementing Regulation (EU) 2019/2072, an implementing act of Regulation (EU) 2016/2031.

3.3.2. Hosts of *R. citrifrugis* that are prohibited from entering the Union from third countries

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

List of plants, plant products and other objects whose introduction into the Union from certain third countries is prohibited			
	Description	**CN Code**	**Third country, group of third countries or specific area of third country**
11.	Plants of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf. and their hybrids, other than fruits and seeds	ex 0602 10 90 ex 0602 20 20 ex 0602 20 30 ex 0602 20 80 ex 0602 90 45 ex 0602 90 46 ex 0602 90 47 ex 0602 90 50 ex 0602 90 70 ex 0602 90 91 ex 0602 90 99 ex 0604 20 90 ex 1404 90 00	All third countries
19.	Soil as such consisting in part of solid organic substances	ex 2530 90 00 ex 3824 99 93	Third countries other than Switzerland
20.	Growing medium as such, other than soil, consisting in whole or in part of solid organic substances, other than that composed entirely of peat or fibre of *Cocos nucifera* L., previously not used for growing of plants or for any agricultural purposes	ex 2530 10 00 ex 2530 90 00 ex 2703 00 00 ex 3101 00 00 ex 3824 99 93	Third countries other than Switzerland

3.4. Entry, establishment and spread in the EU

3.4.1. Entry

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

Comment on plants for planting as a pathway.

Yes, *R. citrifrugis* could enter the EU territory. According to TRACES, this pest was intercepted 11 times from December 2020 to January 2021 in citrus fresh fruit.

Adults of *R. citrifrugis* are unlikely to be carried by either plants for planting, flowers or fruit because they would fly off when disturbed during harvesting and processing for shipment. Moreover, they are extremely short-lived (Table 2). Therefore, *R. citrifrugis* is more likely to move in international trade as immature stages on/in fruit (eggs and larvae), and in soil attached to roots (pupae) of citrus plants, either as a commodity on its own or when accompanying plants for planting. However, the import into the EU of citrus plants for planting is prohibited (Annex VII, 11.). Moreover, the import of soil (either as such) from countries where *R. citrifrugis* occurs (China) is also prohibited (Annex VI 19. & 20.) and import requirements exist for soil attached to machinery (Annex VII 2.). Nevertheless, the import of citrus fruit from third countries is permitted and regulated (Annex VII 57. to 62.). In the period 2016–2020, around 514 thousand tons of citrus were imported into the EU (27) from China (Figure 3; Appendix A). A search of interceptions in Europhyt and TRACES databases revealed 11 interceptions of *R. citrifrugis* by the Dutch NPPO for the period December 2020–January 2021 (accessed on 5 May 2021) in pomelo, *Citrus maxima* (= *C. grandis*), fresh fruit imported from China. This result can be interpreted that although infested fruit can be detected (see Section 3.1.3), and therefore likely rejected during the post-harvest processing, infested fruit can escape post-harvest culling. The Netherlands accounted for 71.1% of total EU (27) imports of citrus fresh fruit from China in the period 2016–2020 (Figure 3). To sum up, fruit is a potential entry pathway for *R. citrifrugis* into the EU (Table 4).

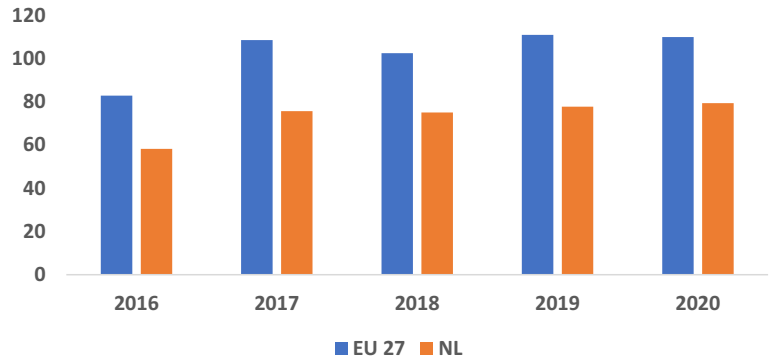

Figure 3: Fruit imported (×1,000 tons) into the EU (27) and the Netherlands (NL) from countries where *R. citrifrugis* is known to occur (China)

Table 4: Potential pathways for *Resseliella citrifrugis* into the EU 27

Pathways	Life stage	Relevant mitigations [e.g. prohibitions (Annex VI) or special requirements (Annex VII) within Implementing Regulation 2019/2072]
Fruits of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf. and their hybrids	Egg, larva	Annex VII (57.) requires fruits of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf. and their hybrids from third countries to be free from peduncles and leaves and the packaging shall bear an appropriate origin mark. Annex VII (58.) requires fruits of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf. and their hybrids from third countries to be free from *Xanthomonas citri* pv. *aurantifolii* (Schaad et al.) Constantin et al. and *Xanthomonas citri* pv. *citri* (Hasse) Constantin et al. Annex VII (59.) requires fruits of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf. and their hybrids from third countries to be free from *Pseudocercospora angolensis* (T. Carvalho & O. Mendes) Crous & U. Braun. Annex VII (60.) requires fruits of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf. and their hybrids from third countries to be free from *Phyllosticta citricarpa* (McAlpine) Van der Aa.

Pathways	Life stage	Relevant mitigations [e.g. prohibitions (Annex VI) or special requirements (Annex VII) within Implementing Regulation 2019/2072]
		Annex VII (61.) requires fruits of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf. and their hybrids from third countries to be free from Tephritidae (non-European). Annex VII (62.) requires fruits of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf. and their hybrids from third countries to be free from *Thaumatotibia leucotreta* (Meyrick). Annex XI A (5.) requires Phytosanitary Certificate for fruits of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf., *Microcitrus* Swingle, *Naringi* Adans., *Swinglea* Merr. and their hybrids from third countries other than Switzerland.
Plants for planting of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf. and their hybrids	Pupa in soil, attached to the roots	Annex VI (11.) bans the introduction of plants of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf. and their hybrids, other than fruits and seeds from all third countries.
Soil and growing media	Pupa	Annex VI (19. & 20.) bans the introduction of soil and growing media as such into the Union from third countries other than Switzerland
Soil on machinery	Pupa	Annex VII (2.) Official statement that machinery or vehicles are cleaned and free from soil and plant debris

3.4.2. Establishment

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

Yes, *R. citrifrugis* would most probably be able to establish in the EU. It could establish in the citrus growing regions of southern EU.

Climatic mapping is the principal method for identifying areas that could provide suitable conditions for the establishment of a pest taking key abiotic factors into account (Baker et al., 2000). Availability of hosts is considered in Section 3.4.2.1. Climatic factors are considered in Section 3.4.2.2.

3.4.2.1. EU distribution of main host plants

As noted above (Section 3.4.1), *R. citrifrugis* is an oligophagous species feeding on *Citrus* spp. fruits only. In the EU, citrus production concentrates in Mediterranean countries (Figure 4). *Citrus* production in the EU is shown in Table 5.

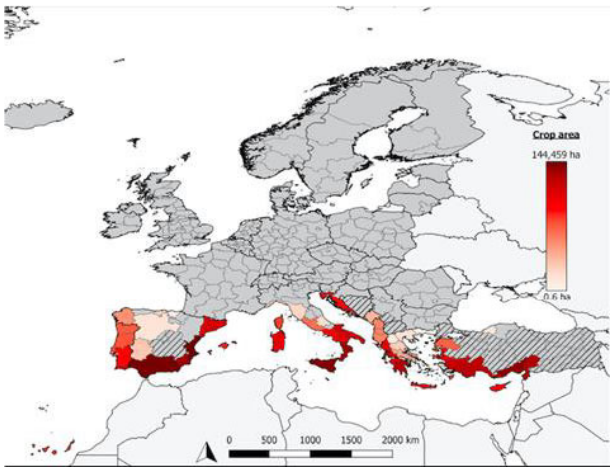

Figure 4: *Citrus* spp. growing areas in Europe. Statistic data of crop area at NUTS 2 level. In dark grey, the regions and countries included in the analysis but with no *Citrus* spp. growing areas. Areas with lines indicate areas with no data (EFSA PLH Panel, 2019)

Table 5: EU MS with 10 ha or more citrus fruit production. (source Eurostat, code T0000, ×1,000 ha) (accessed on 27/04/2021)

MS/Year	2016	2017	2018	2019	2020
EU (27)	519,01	502,84	508,99	512,53	487,08
Spain	295,33	294,26	297,62	296,48	297,97
Italy	147,65	135,36	134,64	140,74	113,80
Greece	45,86	43,47	46,26	44,23	44,48
Portugal	20,36	20,51	21,07	21,07	21,07
France	4,22	4,27	4,39	4,61	4,69
Cyprus	3,41	2,92	3,05	3,20	3,04
Croatia	2,19	2,06	1,97	2,20	2,04

3.4.2.2. Climatic conditions affecting establishment

R. citrifrugis is native to China, in an area where Cfa (humid subtropical), Cfb (oceanic), BSh (hot semi-arid) and BSk (cold semi-arid) climate types also occurring in the EU can be found. Cfa and Cfb occur in most of the Chinese provinces where *R. citrifrugis* occurs. The only exception being the district of Gannan in the province of Gansu, where the pest is known to occur (Xie et al., 2012) and where BSk and BSh can be found. These two climate types (BSk and BSh) are also present in the Chinese province of Sichuan. The whole area primarily encompasses Global Plant Hardiness Zones 8–11 as defined by Magarey et al. (2008). Cfa is the predominant climate type in the area of origin of *R. citrifrugis*, whereas the other three are not so common (Figure 5). In the EU, Cfa climates can be found in Italy (Po Valley, shores of lakes Maggiore, Lugano and Como, and the Adriatic coast), Slovenia and Croatia (Adriatic Coast), Spain (NE Catalonia), Bulgaria and Romania (Black Sea coast) and Portugal (Azores). Citrus can be grown in those areas (Figure 4). However, commercial citrus production is more common in areas with BSh climate types (SE Spain, NE Cyprus) and backyard citrus trees are common in areas with Cfb (NW Spain). BSk climates occur usually at higher altitudes than BSh and can be found in Spain (centre and east) and some small areas in Greece (NE) and Romania (Black Sea coast) where winter temperatures are usually too cold for citrus to be grown. The EU areas with Cfa, Cfb and BSh climate types correspond to Global Plant Hardiness Zones 8–9 (Magarey et al., 2008), which extend to most of western EU and the Mediterranean Basin. Therefore, EU areas with Cfa, Cfb or BSh climate types where citrus occurs may be suitable for establishment of *R. citrifrugis*, should this species enter the EU.

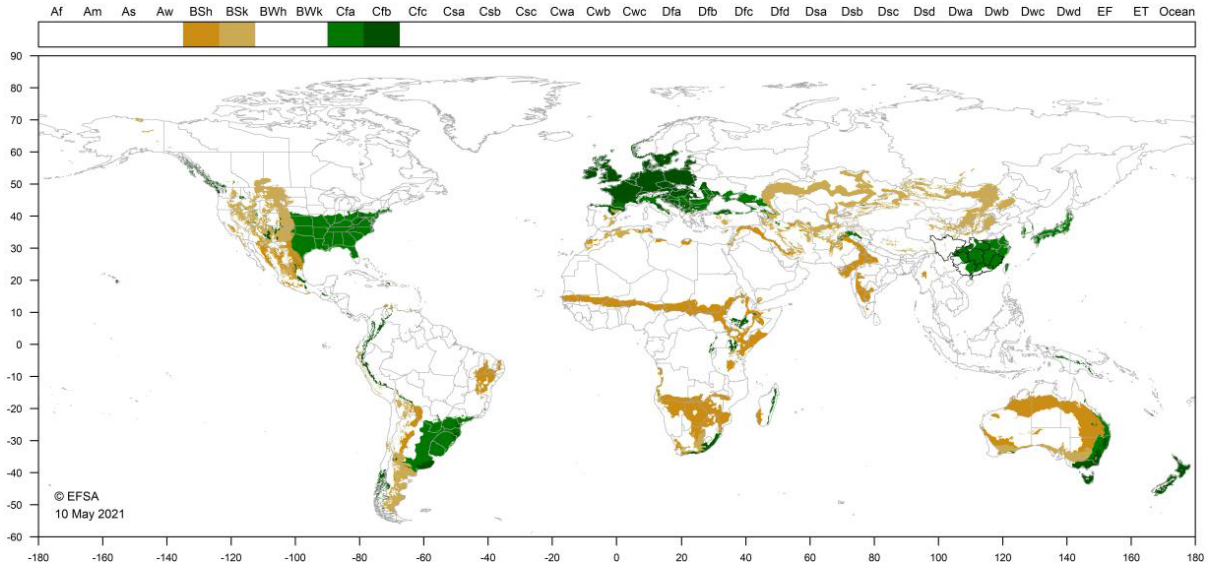

Figure 5: Occurrence of Cfa, Cfb, BSh and BSk climates in the world

3.4.3. Spread

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

R. citrifrugis, is reported not to be a good flier (10–15 m). Spread could also be passive, with air currents. However, adults are short-lived (< 5 days). Spread would be mostly human-assisted as immature larvae in infested produce (citrus fruit).

Comment on plants for planting as a mechanism of spread

Plants for planting with soil could be a mechanism of spread, as mature larvae and pupae occur in the soil. However, as non-bearing nursery citrus plants are not a host for this pest, nursery plants for planting could be discarded as a spread mechanism for *R. citrifrugis*.

The adults of *R. citrifrugis* have limited flight ability (10–15 m), mostly aided by air currents (Huang et al., 2001). However, this species can passively spread over long distances via the human-mediated transport of larvae in citrus fruit, or the larvae and pupae in soil (Huang et al., 2001; Lu and Wang, 2004).

3.5. Impacts

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

Yes, the introduction of *R. citrifrugis* would most probably have an economic impact on the EU territory.

According to USDA (2020): *R. citrifrugis* is an important pest of grapefruit (Huang et al., 2001) and pomelo (Yang, 2010) in China. Programs for its control exist (Wang et al., 1997; Wu et al., 1999; Huang et al., 2001; Lu, 2002). The percentage of field infested fruit ranges from 10 to 70 (Huang et al., 2001; Lu, 2002; Yang, 2010). *R. citrifrugis* causes serious fruit drop (Wang et al., 1997) and can affect yield and storage quality, causing economic losses (Yang, 2010). Yield losses range from 10% to 40% or more (Wang et al., 1997; Xie et al., 2012). Control measures include application of pesticides to soil surface and tree canopies, fruit bagging and cultural control (Wang et al., 1997; Wu et al., 1999; Huang et al., 2001; Lu, 2002; Yang, 2010).

3.6. Available measures and/or potential specific import requirements and limits of mitigation measures

Are there measures available to prevent the entry into the EU such that the risk becomes mitigated?

Yes, citrus plants from third countries are banned from entering into the EU (see Sections 3.3.2 and 3.4.2). Citrus fruit require a phytosanitary certificate (see Section 3.4.2) and could be further sourced from areas free of *R. citrifrugis* (see Section 3.6.1).

3.6.1. Identification of potential additional measures

Phytosanitary measures are currently applied to citrus plants for planting and to soil (see Section 3.3 for prohibitions and Section 3.4.2 for specific requirements on pathways). Therefore, these entry pathways can be considered as closed. However, current regulations applied to the citrus fruit pathway (see Section 3.4.2), do not specifically consider *R. citrifrugis*. As citrus fruit are currently not prohibited for import, potential additional measures are listed in Table 6.

Table 6: Selected control measures (a full list is available in EFSA PLH Panel et al., 2018) for pest entry in relation to currently unregulated hosts and pathways

Special requirements summary (with hyperlink (in blue) to information sheet if available)	Potential control measures summary
Pest freedom	Used to mitigate likelihood of infestation by specified pest at origin, hence to mitigate entry

Special requirements summary (with hyperlink (in blue) to information sheet if available)	Potential control measures summary
Managed growing conditions	Used to mitigate likelihood of infestation at origin
Chemical treatments on crops including reproductive material	Used to mitigate likelihood of infestation of pests susceptible to chemical treatments
Inspections	Used to mitigate likelihood of infestation by specified pest at origin
Chemical treatments on consignments or during processing	Used to mitigate likelihood of infestation of pests susceptible to chemical treatments
Heat and cold treatments	Used to mitigate likelihood of infestation of pests susceptible to physical treatments
Phytosanitary certificate and plant passport	Used to attest which of the above requirements have been applied

3.6.1.1. Biological or technical factors limiting the effectiveness of measures to prevent the entry of the pest

- This is a minute species which may be difficult to detect via visual examination (especially eggs and adults)
- Larvae burrow inside fruit; infested fruit might not be detected during inspections of imports
- Pupae could be hidden in the roots/growing medium of host plants

3.7. Uncertainty

The main uncertainty refers to the lack of a proper description of *R. citrifrugis* as pointed out in Section 3.1.1. However, because the name *Resseliella citrifrugis* is used in multiple sources reporting it as a pest of citrus in China, where symptoms and biology are described (see Sections 3.1.2 and 3.1.4), this uncertainty does not affect the conclusions of this categorisation.

Another source of uncertainty refers to the exact host range of *R. citrifrugis*. Because the scientific names of the hosts within the genus Citrus are not always mentioned in the Chinese literature about this midge, whether important citrus crops for the EU, like mandarins, oranges and lemons, are hosts of this insect remains unknown. This uncertainty, though does not affect the conclusion of this categorisation because other Citrus spp. for which the host-status is clear (i.e. pomelos and grapefruits) are also grown in the EU.

4. Conclusions

R. citrifrugis satisfies the criteria that are within the remit of EFSA to assess for this species to be regarded as a potential Union quarantine pest. There is uncertainty about the identification of *R. citrifrugis* and its exact host range. However, because the name *Resseliella citrifrugis* is used in multiple sources reporting it as a pest of citrus in China, where symptoms, biology and impact are described, these uncertainties do not affect the conclusions of this categorisation. Table 7 shows the summary of the PLH Panel conclusions.

Table 7: The Panel's conclusions on the pest categorisation criteria defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	The identity of *R. citrifrugis* has not been properly established. However, symptoms of infestation are consistent.	There is no proper description of *R. citrifrugis* following international standards (Gagné, 2010; ICZN, 2014)
Absence/presence of the pest in the EU (Section 3.2)	*R. citrifrugis* is not known to occur in the EU territory.	

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Key uncertainties
Regulatory status (Section 3.3)	*R. citrifrugis* is currently not regulated in the EU.	
Pest potential for entry, establishment and spread in the EU (Section 3.4)	*R. citrifrugis* could enter into, establish in and spread within the EU territory. Main entry pathways are: • Plants for planting of *Citrus* spp. (regulated: closed) • Soil and growing medium as such (regulated: closed) • Soil and growing medium, attached to machinery (regulated: open) • *Citrus* spp. fruit (regulated: open)	
Potential for consequences in the EU (3.5)	Should *R. citrifrugis* be introduced into the EU, an economic impact would most likely follow.	
Available measures (Section 3.6)	There are measures to prevent the entry, establishment and spread of *R. citrifrugis* within the EU territory, such as sourcing fruit from PFA.	
Conclusion (4)	*R. citrifrugis* fulfils all criteria assessed by EFSA above for consideration as a quarantine pest	
Aspects of assessment to focus on/scenarios to address in future if appropriate:	A proper description of *R. citrifrugis* would allow this name to be no longer classified as '*nomen nudum*' and would reduce nomenclatural uncertainty.	

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Abbreviations

EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
MS	Member State
PLH	EFSA Panel on Plant Health
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, 2018)
Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 2018)
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, 2018)
Eradication (of a pest)	Application of phytosanitary measures to eliminate a pest from an area (FAO, 2018)

Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2018)
Greenhouse	A walk-in, static, closed place of crop production with a usually translucent outer shell, which allows controlled exchange of material and energy with the surroundings and prevents release of plant protection products (PPPs) into the environment.
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, 2018)
Pathway	Any means that allows the entry or spread of a pest (FAO, 2018)
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, 2018)
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, 2018)
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, 2018)

Appendix A – EU 27 Imports of citrus fruit (in 100 Kg) from countries where *R. citrifrugis* is known to occur (China)

Data from the Eurostat (Eurostat accessed on 5/5/2021)

Summary: EU 27 imports of fresh or dried citrus fruit (hundreds of kg) from China

Country	2016	2017	2018	2019	2020
Austria	1,463.55	237.49			0.00
Belgium (incl. Luxembourg)	539.10	339.90	522.94	339.90	681.75
Bulgaria	1,763.42	3,730.59	3,965.52	3,192.90	3,239.40
Croatia					880.16
Czechia					0.92
Denmark	5,561.04	7,862.25	3,305.10	5,127.54	3,428.70
Finland,		0.00			
France	14,987.10	16,042.79	9,994.15	10,713.16	7,163.45
Germany	34,623.75	25,895.11	29,990.51	39,070.98	45,170.31
Greece	1,983.75	8,728.71	7,143.38	7,317.18	2,595.24
Hungary	0.60		0.16		
Ireland	1,218.08	1,623.11	522.03	1,602.06	7.57
Italy	23,334.29	28,435.82	26,309.75	21,010.69	13,143.37
Latvia	8,844.94	14,838.12	14,614.15	24,089.14	27,012.00
Lithuania	40,729.80	42,080.19	35,979.19	38,916.30	35,540.26
Netherlands	581,697.53	755,921.58	749,737.68	776,883.61	792,856.09
Poland	33,742.44	47,942.80	50,749.44	37,001.28	19,705.61
Portugal			171.60	171.60	171.60
Romania	74,790.59	129,647.21	89,596.42	129,382.43	145,694.80
Slovakia				1.62	5.05
Slovenia	168.30			13,384.80	688.40
Spain	1,011.27	0.40			
Sweden	1,381.02	1,531.20	1,561.13	390.03	702.05
EU 27	**827,840.57**	**1,084,857.27**	**1,024,163.15**	**1,108,595.22**	**1,098,686.73**

Appendix B – Distribution of *Resseliella citrifrugis*

Distribution records based on different sources are presented in the table below.

Region	Country	Subnational (e.g. State)	Status	Reference
North America			No records, presumed absent	
Central America			No records, presumed absent	
Caribbean			No records, presumed absent	
South America			No records, presumed absent	
Europe			Intercepted only, presumed absent	
Africa			No records, presumed absent	
Asia	China	Fujian		Chen and Hou (2010)
		Hubei		Lu and Wang (2004)
		Hunan		Huang et al. (2001), Lu (2002)
		Guangdong		Wu et al. (1999)
		Guanzhi		Yang (2010)
		Guizhou		Lu and Wang (2004)
		Sichuan		Xie et al. (2012)
Oceania			No records, presumed absent	