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## Pest categorisation of *Retithrips syriacus*

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### Abstract

The EFSA Panel on Plant Health performed a pest categorisation of the black vine thrips, *Retithrips syriacus* (Thysanoptera: Thripidae), for the EU territory. This species is not included in EU Commission Implementing Regulation 2019/2072. This polyphagous species feeds, among others, on apple, avocado, banana, cotton, grapevine, persimmon, pear, walnut and other plants cultivated in the EU. *R. syriacus* occurs in several African and Asian countries and in Florida (USA), the Caribbean and Brazil, in a range of climates some of which also occur in the EU. It can complete up to seven generations per year. It overwinters at the adult stage in the soil. Adult females lay up to 60 eggs in 5–10 days in the leaf tissue or less frequently on the leaf surface. Larvae and adults feed usually on the lower side of leaves. Larvae then drop down, enter the soil, and pupate. Potential entry pathways for *R. syriacus*, such as plants for planting, cut flowers and fruits, exist. Soil can be considered as a closed pathway. The pest is not known to be present in the EU territory and there are no reports of interceptions. Should *R. syriacus* arrive in the EU, the availability of hosts and occurrence of potentially suitable climates would be conducive for establishment. Should this species establish in the EU, yield and quality losses in several fruit trees production is anticipated. *R. syriacus* satisfies the criteria that are within the remit of EFSA to assess for this species to be regarded as a potential Union quarantine pest.

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**Keywords:** castor thrips, black vine thrips, grape thrips, Thysanoptera, pest risk, plant health, plant pest, quarantine

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## 1. Introduction

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

#### 1.1.1. Background

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-2021-00,027 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-2021-00,027 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

*Retithrips syriacus* is one of a number of pests listed in Annex 1A to the Terms of Reference (ToR) (1.1.2.) 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.

## 2. Data and methodologies

### 2.1. Data

#### 2.1.1. Literature search

A literature search on *R. syriacus* 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 *R. syriacus*, 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. While 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)
<b>Identity of the pest (Section 3.1)</b>	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?
<b>Absence/presence of the pest in the EU territory (Section 3.2)</b>	Is the pest present in the EU territory? If present, is the pest widely distributed within the EU? Describe the pest distribution briefly
<b>Regulatory status (Section 3.3)</b>	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.
<b>Pest potential for entry, establishment and spread in the EU territory (Section 3.4)</b>	Is the pest able to enter into, become established in, and spread within, the EU territory? If yes, briefly list the pathways
<b>Potential for consequences in the EU territory (Section 3.5)</b>	Would the pests' introduction have an economic or environmental impact on the EU territory?
<b>Available measures (Specific import requirements) (Section 3.6)</b>	Are there measures available to prevent the entry into the EU such that the likelihood of introduction becomes mitigated?
<b>Conclusion of pest categorisation (Section 4)</b>	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential quarantine pest were met and (2) if not, which one(s) were not met.

### 3. Pest categorisation

#### 3.1. Identity and biology of the pest

##### 3.1.1. Identity and taxonomy

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

**Yes**, the identity of the species is established and *Retithrips syriacus* (Mayet) is the accepted name.

*Retithrips syriacus* (Mayet) is an insect of the order Thysanoptera, family Thripidae. Junior synonyms include *Dictyothrips aegyptiacus*, *D. zanoniana*, *Heliiothrips syriacus*, *Retithrips aegyptiaca*, *Retithrips aegyptiacus*, *Stylothrips bondari* (EPPO, online; CABI datasheet online accessed on 11/6/2021). The following common names are used for this species: castor thrips, black vine thrips and grape thrips (EPPO, online).

The EPPO code<sup>1</sup> for this species is: RETTSY (EPPO, online, accessed on 11/6/2021).

##### 3.1.2. Biology of the pest

Adults usually mate on the day of emergence and females start laying eggs 3 days after. *R. syriacus* is parthenogenic (CABI, online). During winter *R. syriacus* is very rarely found on plants; adults overwinter in the soil (Ben-Yakir, 2012). A complete life cycle can take between 15 and 30 days under open air conditions and less in greenhouses. *R. syriacus* can produce several generations annually (Gerson and Aplebaum, online). In India on castor (*Ricinus communis*), a generation cycle is completed in 15–20 days (Sujatha et al., 2011). Females lay eggs in the leaf tissue or less frequently on the leaf surface (Medina-Gaud and Franqui, 2001). Only males emerge from unfertilised eggs. Newly hatched larvae feed immediately. The adults also feed, usually on the lower side of leaves. Larvae and pupae have a bright reddish colour (Medina-Gaud and Franqui, 2001) (Figure 1).

<sup>1</sup> 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 harmonized system to facilitate the management of plant and pest names in computerized databases, as well as data exchange between IT systems (Griessinger and Roy, 2015; EPPO, 2019).





**Figure 1:** Juvenile stages of *Retithrips syriacus* (Copyright: Shutterstock)

Larvae become fully grown in 7–9 days. Then they drop down, enter the soil and after a pre-pupal stage they pupate. Pupae are not only resistant to low humidity, but are also extremely sensitive to high air humidity approaching 100% RH. In autumn, the sex ratio is even, whereas in other seasons, females far outnumber males. At times, the females even comprise 70–80% of the total adult population. Adults can fly and live for more than 1 month (Gerson and Aplebaum, online).

**Table 2:** Important features of the life history strategy of *Retithrips syriacus*

Life stage	Phenology and relation to host	Other relevant information
<b>Egg</b>	Eggs are laid in the leaf tissue or less frequently on the leaf surface. Oviposition stops when temperatures drop below 17°C or rise above 37°C. Egg mortality is still low at 30°C but increases rapidly with rising temperature.	Each female lays around 40–60 eggs in 5–10 days. Eggs hatch in 4–5 days (Sujatha et al., 2011).
<b>Larva</b>	Larvae have a bright red color (Medina-Gaud and Franqui, 2001). There are two larval instars. Newly hatched larvae feed immediately.	The larvae are less sensitive than the eggs to extreme climatic conditions, though mortality increases when the temperature rises above 33°C. Above 37°C no larvae attain pupation. The majority of larvae also die when the temperature drops below 14°C. Larvae are resistant, however, to low air humidity as long as the host leaf is water-saturated.
<b>Pupa</b>	Larvae drop down, enter into the soil and pupate. The pupa is bright red (Medina-Gaud and Franqui, 2001).	The pupal stage lasts for 2–3 days (Sujatha et al., 2011). Pupae are resistant to low humidity, but are also extremely sensitive to high air humidity approaching 100% RH. Cold air ( $\leq 15^\circ\text{C}$ ) and also high temperatures (37°C) are lethal to most of the pupae.
<b>Adult</b>	Adults usually mate on the day of emergence. <i>R. syriacus</i> can be sometimes parthenogenic (CABI, online). During winter <i>R. syriacus</i> is very rarely on plants, the adults overwinter in the soil (Ben-Yakir, 2012).	Under favourable climatic conditions the adults live from 10 to 20 days, whereas at lower temperatures longevity may reach 40 days. In summer the female starts to lay about 3 days after emergence, though in colder seasons there is a pre-oviposition period of 8–18 days. Only males emerge from unfertilised eggs. Females usually outnumber males, only in autumn the sex ratio is even (CABI, online). Adults can hop and fly (Gerson and Aplebaum, online).

### 3.1.3. Host range

*R. syriacus* is a polyphagous pest and has over 50 host plant species (Gerson and Aplebaum, online) belonging to more than 20 different plant families (Appendix B). The species is reported on hosts such as apple (*Malus domestica*), wild apple (*M. sylvestris*), avocado (*Persea americana*), banana (*Musa* spp.), Brazil pepper tree (*Schinus molle*), cassava (*Manihot esculenta*), chestnut (*Castanea* sp.) coconut (*Cocos nucifera*), coffee (*Coffea* spp.), cotton (*Gossypium hirsutum*), European pear (*Pyrus communis*), grapevine (*Vitis vinifera*), Japanese plum (*Prunus salicina*), myrtle (*Myrtus communis*), peppervine (*Ampelopsis orientale*), persimmon (*Diospyros kaki*), poplar (*Populus* spp.), rose (*Rosa* spp.), walnut (*Juglans regia*) and other plants (Doğanlar and Yiğit, 2002, CABI, online).

### 3.1.4. Intraspecific diversity

No intraspecific diversity is reported.

### 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 available for *R. syriacus*.

#### Detection

Adults can be caught using colour sticky traps (no particular colour mentioned in the literature) and can be also noticed by careful visual inspection.

#### Symptoms

*Retithrips syriacus* adults and nymphs damage foliage (especially the lower leaf surface), fruits and sepals. When infestation is heavy, the upper surfaces of leaves are also attacked and fruits fail to develop normally (CABI, online). The main symptoms are:

- grey dots on leaves (from insertions of the stylets),
- shiny black dots on leaves (excrements),
- fruit discoloration (fruits turn grey at feeding sites),
- crinkling of the terminal leaves with a silvery appearance,
- stunted growth of plants,
- fruit size deformation,
- defoliation

(Hamon and Edwards, 1994; Sujatha et al., 2011; CABI, online).

#### Identification (Hoddle et al., 2012)

- Only two species are recognised in the genus *Retithrips*; the other one, *R. javanicus* Karny, being known only from Indonesia and northern Australia. The forewings of these two species are highly distinctive of the genus, bearing two or more blister-like swellings. The antennal segments are foreshortened, but the sensoria on segments III & IV are forked at the base.
- *R. syriacus*: body dark brown, tarsi yellow, antennal segment III yellowish brown, segment V almost white; forewing grey with three brown swellings. Body shape distinctive, with pterothorax unusually broad. Head wider than long, ocelli on conical projection, posteromedian area reticulate. Antennae 8-segmented, but segments VI–VIII sometimes without dividing sutures; III and IV each with forked sensorium that lacks a basal stem and arises in large pit. Pronotum exceptionally short. Mesonotum without longitudinal division. Metanotum with broad reticulate triangle, one pair of setae near posterior. Tarsi 1-segmented. Forewing broad, with 3 swellings along costal margin; costa without cilia; posteromarginal cilia straight. Tergites III–X grooved medially, III–VIII with 1 pair of large median setae; VIII with long posteromarginal comb of microtrichia; sternal marginal setae small.

#### Description (full description available: Elimem et al., 2011; Medina-Gaud and Franqui, 2001)

- The adult is 1.3–1.5 mm long, dark red, the feather-like wings are pale brown.
- The larvae are initially hyaline, later turning yellow-orange, and then red; length up to 1.5 mm.

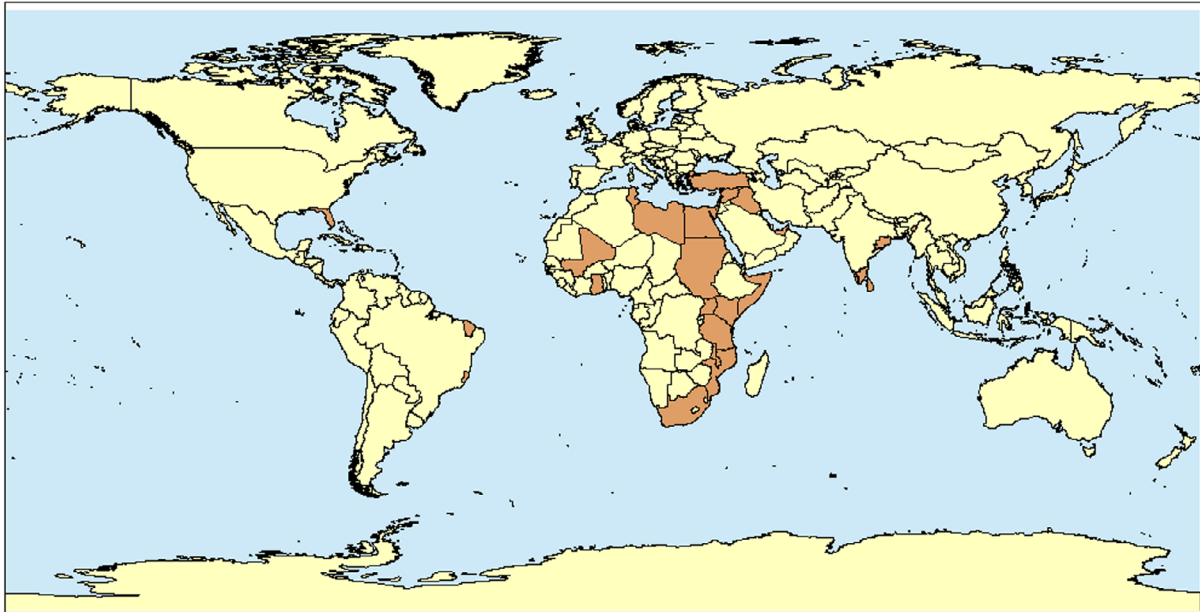


- The pupa is less brilliant red than the larva. Body truncate with setae long with a small round flat disc at the apex. Wing pads longer than in pre-pupa. Eyes large, compound, resembling those of the adults.

### 3.2. Pest distribution

#### 3.2.1. Pest distribution outside the EU

*R. syriacus* occurs in African and Asian countries (including Egypt, Israel, Libya, Syria, Tunisia, Turkey in the Mediterranean basin) (Elimem et al., 2011). It has spread to Florida (US), the Caribbean and Brazil (Hamon and Edwards, 1994) (Figure 2).



**Figure 2:** Global distribution of *Retithrips syriacus* (Source: literature and CABI database accessed on 10/6/2021)

Appendix A provides national and subnational records of occurrence.

There is uncertainty over the global distribution of *R. syriacus*; viewing the distribution in Figure 2, it is possible that it occurs more widely but is unreported, for example in Africa and Asia.

#### 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. syriacus* is not known to be present in the EU.

### 3.3. Regulatory status

#### 3.3.1. Commission Implementing Regulation 2019/2072

*Retithrips syriacus* 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 *Retithrips syriacus* that are prohibited from entering the Union from third countries

According to the Commission Implementing Regulation (EU) 2019/2072, Annex VI, introduction of several *Retithrips syriacus* hosts in the Union from certain third countries is prohibited (Table 3).

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

<b>List of plants, plant products and other objects whose introduction into the Union from certain third countries is prohibited</b>			
	Description	CN Code	Third country, group of third countries or specific area of third country
2.	Plants of <i>Castanea</i> Mill. and (. . .), with leaves, other than fruit and seeds	ex 0602 10 90 ex 0602 20 20 ex 0602 20 80 ex 0602 90 41 ex 0602 90 45 ex 0602 90 46 ex 0602 90 48 ex 0602 90 50 ex 0602 90 70 ex 0602 90 99 ex 0604 20 90 ex 1404 90 00	Third countries other than: Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canary Islands, Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, Russia (only the following parts: Central Federal District (Tsentralny federalny okrug), Northwestern Federal District (Severo-Zapadny federalny okrug), Southern Federal District (Yuzhny federalny okrug), North Caucasian Federal District (Severo-Kavkazsky federalny okrug) and Volga Federal District (Privolzhsky federalny okrug)), San Marino, Serbia, Switzerland, Turkey and Ukraine
3.	Plants of <i>Populus</i> L., with leaves, other than fruit and seeds	ex 0602 10 90 ex 0602 20 20 ex 0602 20 80 ex 0602 90 41 ex 0602 90 45 ex 0602 90 46 ex 0602 90 48 ex 0602 90 50 ex 0602 90 70 ex 0602 90 99 ex 0604 20 90 ex 1404 90 00	Canada, Mexico, United States
8.	Plants for planting of <i>Chaenomeles</i> Ldl., <i>Crateagus</i> L., <i>Cydonia</i> Mill., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L. and <i>Rosa</i> L., other than dormant plants free from leaves, flowers and fruits	ex 0602 10 90 ex 0602 20 20 ex 0602 20 80 ex 0602 40 00 ex 0602 90 41 ex 0602 90 45 ex 0602 90 46 ex 0602 90 47 ex 0602 90 48 ex 0602 90 50 ex 0602 90 70 ex 0602 90 91 ex 0602 90 99	Third countries other than: Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canary Islands, Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, Russia (only the following parts: Central Federal District (Tsentralny federalny okrug), Northwestern Federal District (Severo-Zapadny federalny okrug), Southern Federal District (Yuzhny federalny okrug), North Caucasian Federal District (Severo-Kavkazsky federalny okrug) and Volga Federal District (Privolzhsky federalny okrug)), San Marino, Serbia, Switzerland, Turkey and Ukraine
9.	Plants for planting of <i>Cydonia</i> Mill., <i>Malus</i> Mill., <i>Prunus</i> L. and <i>Pyrus</i> L. and their hybrids, and <i>Fragaria</i> L., other than seeds	ex 0602 10 90 ex 0602 20 20 ex 0602 90 30 ex 0602 90 41 ex 0602 90 45 ex 0602 90 46 ex 0602 90 48 ex 0602 90 50 ex 0602 90 70 ex 0602 90 91 ex 0602 90 99	Third countries, other than: Albania, Algeria, Andorra, Armenia, Australia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canada, Canary Islands, Egypt, Faeroe Islands, Georgia, Iceland, Israel, Jordan, Lebanon, Libya, Liechtenstein, Moldova, Monaco, Montenegro, Morocco, New Zealand, North Macedonia, Norway, Russia (only the following parts: Central Federal District (Tsentralny federalny okrug), Northwestern Federal District (Severo-Zapadny federalny okrug), Southern Federal District (Yuzhny federalny okrug), North Caucasian Federal District (Severo-Kavkazsky federalny okrug) and Volga Federal District (Privolzhsky federalny okrug)), San Marino, Serbia, Switzerland, Syria, Tunisia, Turkey, Ukraine, and United States other than Hawaii
10.	Plants of <i>Vitis</i> L., other than fruits	0602 10 10 0602 20 10 ex 0604 20 90 ex 1404 90 00	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.** The pest can enter into the EU territory with fruit and plants for planting as main pathways.

Fruits and plants for planting are the main pathways for entry of this thrips (Wistermann et al., 2016), besides these, cut flowers with leaves can also be considered as a pathway (Lima and Zucchi, 2016). *R. syriacus* can be associated with soil (Ben-Yakir, 2012) which could however be considered as a closed pathway (Table 4).

**Table 4:** Potential pathways for *R. syriacus* into the EU 27

Pathways	Life stage	Relevant mitigations [e.g. prohibitions (Annex VI) or special requirements (Annex VII) within Implementing Regulation 2019/2072]
Hosts plants for planting with roots and growing media.	Eggs, larvae and adults	Section 3.3.2 summarises plants for planting that are prohibited by Annex VI. The growing medium attached to or associated with plants, intended to sustain the vitality of the plants, are regulated in Article VII of Regulation 2019/2072 (point 1.) Plants for planting from third countries require a phytosanitary certificate and may be inspected on arrival No special requirements in Annex VII relate to <i>R. syriacus</i> .
Fruit	Larvae and adults	A phytosanitary certificate is required to import fresh fruits and nuts into the EU (2019/2072, Annex XI, Part A) unless exempt by being listed in 2019/2072 Annex XI, Part C). Indeed, <i>R. syriacus</i> infests also fruit hosts that are in Annex XI, Part C (i. e. coconut, and bananas), hence their introduction does not require a phytosanitary certificate. In case coconuts are de-husked for export, they are not considered a pathway. However, no specific requirements are specified in relation to <i>R. syriacus</i> . A proportion of imported consignments are liable to be physically inspected but not all consignments will be inspected.
Soil	Pupae and adults in soil	Soil from third countries is prohibited (Annex VI, 19. and 20.)
Cut flowers with leaves	Eggs, larvae and adults	Annex XI: List of plants, plant products and other objects subject to phytosanitary certificates and those for which such certificates are not required for their introduction into the Union territory A. List of plants, plant products and other objects, as well as the respective third countries of origin or dispatch, for which, pursuant to Article 72(1) of Regulation (EU) 2016/2031 phytosanitary certificates are required for their introduction into the Union territory 6. Cut flowers of: <i>Aster</i> spp., <i>Eryngium</i> L., <i>Hypericum</i> L., <i>Lisianthus</i> L., <i>Rosa</i> L. and <i>Trachelium</i> L.

Imports of some hosts are summarised in Table 5.

**Table 5:** Aggregate annual EU 27 imports of *Retithrips syriacus* hosts from countries where *R. syriacus* is known. Source: Eurostat, Hundreds of Kg. Eurostat accessed on 18/6/2021

	CN code	2016	2017	2018	2019	2020
Grapes	0806 10	2,725,416	32,658	3,084,207	3,262,528	3,112,103
Guavas, mangoes	0804 50	1,341,373	1,429,647	1,499,247	1,763,406	1,872,863
Apples, pears and quinces	0808	1,392,718	1,359,975	1,396,671	1,122,494	1,226,280

	CN code	2016	2017	2018	2019	2020
Coconuts, Brazil nuts and cashew nuts	0801	356,187	355,999	315,126	362,014	326,587
Beans	0708 20	325,886	319,954	311,431	300,268	324,097
Plums	0809 4005	272,641	315,791	275,110	208,283	247,355
Figs	0804 2010	107,431	120,784	127,417	143,311	157,299
Bananas	0803	162,562	36,159	72,226	118,901	113,780
Persimmons	0810 70	3,493	4,375	1,704	9,014	8,667
Cassava	0714 10	2,577	2,768	2,380	2,971	4,671
Roses	0602 40	104	109	1,489	190	50

Annual imports of each commodity from specific countries where *R. syriacus* is known are provided in Appendix C. Notifications of interceptions of harmful organisms began to be compiled in Europhyt in May 1994 and in TRACES in May 2020. As at 17 June 2021 there were no records of interception of *R. syriacus* in the Europhyt and TRACES databases.

### 3.4.2. Establishment

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

**Yes**, host availability and climate suitability suggest that some parts of the EU would be suitable for establishment.

Areas in southern Portugal, around the Mediterranean coast and islands in the Mediterranean are the most suitable in the EU, where establishment also following transfer from cut flowers and fruits could be possible.

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, and in Appendix B, *R. syriacus* is polyphagous. Cultivated hosts such as avocado, grapevine, persimmon, walnut, apple, European pear, rose, poplar and, cotton are distributed widely as commercial crops across the EU. Table 6 shows the harvested area of key hosts cultivated in the EU 27 in recent years.

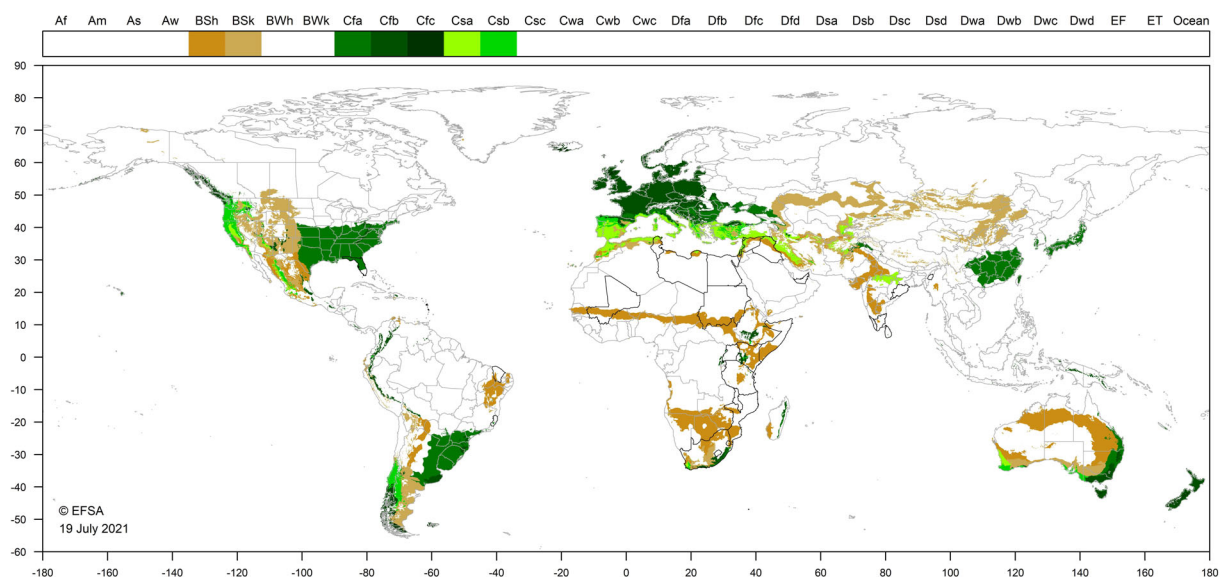
**Table 6:** Crop production of *Retithrips syriacus* hosts in EU 27, 2016–2020 (Eurostat accessed on 18/6/2021) in 1,000 ha

Crop	Eurostat code	2016	2017	2018	2019	2020
Grapes	W1000	3,136.04	3,134.93	3,137.17	3,160.68	3,162.48
Apples	F1110	506.48	505.55	507.24	491.35	473.66
Cotton fibre	I2300	301.34	326.12	345.64	361.78	350.07
Pears	F1120	115.76	114.84	114.84	111.84	108.83
Fresh beans	V5200	96.17	99.36	94.65	91.31	93.49
Walnuts	F4100	72.61	74.15	80.60	86.10	88.43
Figs	F2100	23.74	24.63	24.99	25.92	27.13
Avocados	F2300	12.24	12.72	13.22	15.52	17.27
Bananas	F2400	20.30	18.91	17.94	18.19	19.61

#### 3.4.2.2. Climatic conditions affecting establishment

Although hosts are widely available across the EU (see Section 3.4.2.1), EU climates may be a limiting factor affecting the establishment of *R. syriacus*. This is primarily a tropical and sub-tropical species. Oviposition stops and egg mortality occurs when temperatures drop below 17°C or rise above 37°C. Besides, at 37°C larvae fail to hatch and above 37°C no larvae attain pupation. The majority of larvae and pupae die when the temperature drops below 14–15°C. The global Köppen-Geiger climate

zones (Kottek et al., 2006) describe terrestrial climate in terms of average minimum winter temperatures and summer maxima, amount of precipitation and seasonality (rainfall pattern). Climatic zones BSh (dry, hot semi-arid steppe; sub-tropical steppe; low-altitude dry), Cfa (temperate, uniform precipitation through year; Humid sub-tropical, Mild, no dry season, hot summer) and Csa (temperate, dry hot summer) occur in countries (Figure 3) where *R. syriacus* is known to be present (Doğanlar and Yiğit, 2002; Elimem et al., 2011; Zanuncio-Junior et al., 2016). These climates also occur in the EU, especially in southern Europe. *R. syriacus* has also been found in countries where climates Csb, Cfb, Cfc and BSk occur. These climate types also occur in the EU (Figure 3) (MacLeod and Korycinska, 2019). However, Köppen–Geiger climate zones do not capture the number of frost days, which may be a better tool to inform judgments about whether and where in the EU *R. syriacus* might establish. Appendix D, shows the mean number of frost days each year on a global scale for the 30 year period 1988–2017, sourced from the Climatic Research Unit high resolution gridded dataset CRU TS v. 4.03 at 0.5° resolution (<https://crudata.uea.ac.uk/cru/data/hrg/>). A simple visual comparison of Figure 2 (global distribution of *R. syriacus*) and Appendix D indicates that *R. syriacus* occurs primarily in countries with few frost days (red colours in Appendix D). Appendix D indicates that the fewest frost days occur in southern Portugal, around the Mediterranean coast and islands in the Mediterranean; a much smaller area than suggested by Figure 3.



**Figure 3:** World distribution of six Köppen-Geiger climate types that occur in the EU and which occur in the countries where *Retithrips syriacus* has been reported

### 3.4.3. Spread

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

Adults fly actively for short distances and passively on wind currents, which could also aid adult spread within the EU. Pupae and overwintering adults in soil moved with rooted host plants for planting could facilitate spread in trade. Movement of fruit can also contribute to the species spread.

*Comment on plants for planting as a mechanism of spread.*

Fruit and plants for planting are the main pathways of spread.

### 3.5. Impacts

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

**Yes**, if *R. syriacus* established in the EU, it would most probably have an economic impact on the numerous hosts present in the EU supporting the development of this species.



The pest is affecting yield and quality by defoliating and shrivelling the leaves, scarring fruit and staining fruit and leaves with droplets of faeces. In general, the damage of this thrips interferes with the normal development of the host plants (Medina-Gaud and Franqui, 2001; AGDA 2015). In the near East, this species is a pest of grapes, trees and shrubs and causes heavy infestations in castor bean plants. Economic damage of *R. syriacus* is reported on persimmon and avocado plants in Israel where it also commonly infests grapevine, myrtle, rose, cotton (Ben-Yakir, 2012) and *Ficus carica* (Avidov and Harpaz, 1969). Economic damage is also reported on grapevine in India (Reddy, 2006; DROPSA, 2016) and in Brazil (Moreira et al., 2012). Severe losses are also recorded in cotton in South India, Malawi and Tanzania under hot and dry conditions (Medina-Gaud and Franqui, 2001). Impacts in the EU would be expected to be lower given the cooler conditions compared to some of the countries where severe losses were reported.

### 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.** Although not specifically targeted against *R. syriacus*, existing phytosanitary measures mitigate the likelihood of its entry within the EU (see also 3.6.1).

#### 3.6.1. Identification of potential additional measures

Phytosanitary measures are currently applied to many *R. syriacus* hosts (see Section 3.3.2), although measures in Annex VII of Commission Implementing Regulation 2019/2072 do not specifically refer to this pest.

Potential additional control measures on hosts that are imported are listed in Table 7.

**Table 7:** Selected control measures (a full list is available in EFSA PLH Panel, 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
<a href="#">Growing plants in isolation</a>	Used to mitigate likelihood of infestation by specified pest in vicinity of growing site. Plants can be protected using nets with appropriate mesh.
Chemical treatments on crops including reproductive material	Used to mitigate likelihood of infestation of pests susceptible to chemical treatments. No pesticide efficacy trials specific for <i>R. syriacus</i> are available, however several effective compounds against thrips are known, though considering their tendency to develop insecticide resistance.
<a href="#">Soil treatment</a>	Used to mitigate likelihood of presence of pupae in the soil.
Inspections	Used to mitigate likelihood of infestation by specified pest at origin.
<a href="#">Chemical treatments on consignments or during processing</a>	Used to mitigate likelihood of infestation of pests susceptible to chemical treatments.
<a href="#">Physical treatments on consignments or during processing</a>	Used to mitigate likelihood of infestation of pests susceptible to physical treatments. The occurrence of the pest has been reported to be significantly correlated with a decrease in humidity.
<a href="#">Heat and cold treatments</a>	Used to mitigate likelihood of infestation of pests susceptible to physical treatments. Cold air (15°C and less) and also high temperatures (37°C) are lethal to most of the pupae as well as to the other instars.
<a href="#">Controlled atmosphere</a>	Used to mitigate likelihood of infestation of pests susceptible to modified atmosphere (usually applied during transport) hence to mitigate entry.
<a href="#">Cleaning and disinfection of facilities, tools and machinery</a>	Used to mitigate likelihood of entry or spread of soil borne pests.
Limits on soil	Used to mitigate likelihood of entry or spread via pests in soil. Pupae of <i>R. syriacus</i> can be found in the soil.
Phytosanitary certificate and plant passport	Used to attest which of the above requirements have been applied.

The eulophid parasitoid *Thripoctenus javae* Girault (= *Thripobius semiluteus* Bouček) was identified as a natural enemy of *R. syriacus* in Guadeloupe. This parasitoid can provide a very efficient control of the pest in particular on *Bucida buceras* and *Lagestroemia speciosa* (Etienne et al., 2015) as occurred for other thrips of pest importance such as *Heliethrips haemorrhoidalis* (Bouché) (Bernardo et al., 2005). In Israel, the larval parasitoid *Ceraninus menes* and the egg parasitoid *Megaphragma priesneri* are common enemies of *R. syriacus*. Predators include the thrips *Franklinothrips megalops* and several phytoseiid mites, but their overall effect is not clear (Gerson and Aplebaum, online).

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

- *R. syriacus* is difficult to detect when present in low numbers
- Eggs can be overlooked when inserted into leaves
- Pupae can be hidden in the soil/growing medium
- During transport, the host plant provides a controlled environment with moisture and nutrients, protecting the thrips from extreme temperatures, topical pesticides and vigorous washes that do not penetrate the tight folds of buds to control the thrips

## 3.7. Uncertainty

Although hosts are widely available across the EU (see Section 3.4.2.1), EU climates are a major limiting factor potentially affecting the establishment of *R. syriacus* in most parts of the EU territory. This is primarily a tropical and sub-tropical species. Therefore, there is uncertainty about the establishment of *R. syriacus* in the EU. However, as it already occurs in some Mediterranean countries (Egypt, Israel, Libya, Syria, Tunisia, Turkey), its establishment in Southern EU could be more likely.

## 4. Conclusions

*R. syriacus* satisfies all the criteria that are within the remit of EFSA to assess for it to be regarded as a potential Union quarantine pest. Pest categorisation conclusions are presented in Table 8.

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

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Key uncertainties
<b>Identity of the pest (Section 3.1)</b>	The identity of <i>R. syriacus</i> is well established.	
<b>Absence/presence of the pest in the EU (Section 3.2)</b>	<i>R. syriacus</i> is not known to occur in the EU territory.	
<b>Regulatory status (Section 3.3)</b>	<i>R. syriacus</i> is currently not regulated in the EU.	
<b>Pest potential for entry, establishment and spread in the EU (Section 3.4)</b>	<i>R. syriacus</i> could enter into, establish in, and spread within the EU territory. Main pathways are: <ul style="list-style-type: none"> <li>– plants for planting</li> <li>– cut flowers</li> <li>– soil and growing medium as such or attached to machinery</li> <li>– fruit</li> </ul>	
<b>Potential for consequences in the EU (Section 3.5)</b>	Should <i>R. syriacus</i> be introduced into the EU, an economic impact would most likely follow.	
<b>Available measures (Section 3.6)</b>	There are measures to prevent the entry, establishment and spread of <i>R. syriacus</i> within the EU territory, such as sourcing plants for planting from PFA.	
<b>Conclusion (Section 4)</b>	<i>R. syriacus</i> fulfils all criteria assessed by EFSA above for consideration as a quarantine pest.	
<b>Aspects of assessment to focus on/scenarios to address in future if appropriate</b>	Establishment and impact	

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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
PFA	Pest Free Area
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 (Food and Agriculture Organization of the United Nations), 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 – Distribution of *Retithrips syriacus*

Distribution records based on the literature and databases: EPPO Global Database (EPPO, online) and CABI (accessed on 11/6/2021) with its original references.

Region	Country	Sub-national (e.g. State)	Status
North America	USA	Florida	Hamon and Edwards (1994)
			No records, presumed absent
Central America			
Caribbean	Puerto Rico		Hamon and Edwards (1994), Medina-Gaud and Franqui (2001)
	Guadeloupe		Etienne et al. (2015)
	Martinique		Etienne et al. (2015)
South America	Brazil	Ceara	Bastos et al. (1979), Monteiro (2002)
		Espirito Santo	Zanuncio-Junior et al. (2016)
Europe			No records, presumed absent
Africa	Ghana		Hamon and Edwards (1994)
	Egypt		Ibrahim (2017)
	Kenya		Elimem et al. (2011)
	Lebanon		Hamon and Edwards (1994)
	Libya		Elimem et al. (2011)
	Malawi		(CABI CPC)
	Mali		Elimem et al. (2011)
	Mozambique		Elimem et al. (2011)
	Somalia		Elimem et al. (2011)
	South Africa		Elimem et al. (2011)
	Sudan		Elimem et al. (2011)
	Tanzania		(CABI CPC)
	Tunisia		Elimem et al. (2011)
	Uganda		Elimem et al. (2011)
Asia	India	Kerala	Lal and Pillai (1980)
		Manipur	Sarma et al. (2005)
		Odisha	Singha et al. (2016)
		Tamil Nadu	CABI Data Mining (Undated)
	Iraq		Hamodi and Abdul-Rassoul (2004), Hamodi and Abdul-Rassoul (2008)
	Israel		CABI Data Mining (Undated)
	Palestine		Elimem et al. (2011)
	Sri Lanka		Oda et al. (1997), Tillekaratne et al. (2011)
	Syria		Elimem et al. (2011)
	Turkey		Doğanlar and Yiğit (2002), Elimem et al. (2011)
United Arab Emirates		Elimem et al. (2011)	
Oceania			No records, presumed absent

## Appendix B – *Retithrips syriacus* host plants and plants affected

Source: CABI Plantwise Knowledge Bank (modified).

Host status	Plant family	Host name	Common name
Cultivated hosts	Anacardiaceae	<i>Cotinus coggygria</i>	Fustet
Cultivated hosts	Anacardiaceae	<i>Mangifera indica</i>	Mango
Cultivated hosts	Anacardiaceae	<i>Pistacia vera</i>	Pistachio
Cultivated hosts	Anacardiaceae	<i>Rhus typhina</i>	Staghorn sumac
Cultivated hosts	Anacardiaceae	<i>Schinus terebinthifolius</i>	Brazilian pepper tree
Cultivated hosts	Arecaceae	<i>Cocos nucifera</i>	Coconut
Cultivated hosts	Caprifoliaceae	<i>Lonicera</i>	Honeysuckles
Cultivated hosts	Combretaceae	<i>Terminalia catappa</i>	Singapore almond
Cultivated hosts	Ebenaceae	<i>Diospyros kaki</i>	Persimmon
Cultivated hosts	Euphorbiaceae	<i>Jatropha curcas</i>	Jatropha
Cultivated hosts	Euphorbiaceae	<i>Manihot esculenta</i>	Cassava
Cultivated hosts	Euphorbiaceae	<i>Ricinus communis</i>	Castor bean
Cultivated hosts	Fabaceae	<i>Acacia longifolia</i>	Golden wattle
Cultivated hosts	Fabaceae	<i>Cercis siliquastrum</i>	Judas tree
Cultivated hosts	Fabaceae	<i>Leucaena</i>	
Cultivated hosts	Fabaceae	<i>Leucaena leucocephala</i>	Leucaena
Cultivated hosts	Fabaceae	<i>Phaseolus vulgaris</i>	Common bean
Cultivated hosts	Fabaceae	<i>Vigna unguiculata</i>	Cowpea
Cultivated hosts	Fagaceae	<i>Castanea</i>	Chestnuts
Cultivated hosts	Juglandaceae	<i>Juglans regia</i>	Walnut
Cultivated hosts	Lauraceae	<i>Persea americana</i>	Avocado
Cultivated hosts	Lythraceae	<i>Lagerstroemia indica</i>	Indian crape myrtle
Cultivated hosts	Lythraceae	<i>Lagerstroemia speciosa</i>	Pride of India
Cultivated hosts	Malvaceae	<i>Gossypium</i>	Cotton
Cultivated hosts	Malvaceae	<i>Gossypium arboreum</i>	Cotton
Cultivated hosts	Moraceae	<i>Ficus</i>	
Cultivated hosts	Musaceae	<i>Musa</i>	Banana
Cultivated hosts	Myrtaceae	<i>Eucalyptus</i>	
Cultivated hosts	Myrtaceae	<i>Eucalyptus globulus</i>	Tasmanian blue gum
Cultivated hosts	Myrtaceae	<i>Eugenia uniflora</i>	Surinam cherry
Cultivated hosts	Myrtaceae	<i>Feijoa</i>	
Cultivated hosts	Myrtaceae	<i>Myrtus communis</i>	Myrtle
Cultivated hosts	Myrtaceae	<i>Psidium guajava</i>	Guava
Cultivated hosts	Onagraceae	<i>Fuchsia</i>	
Cultivated hosts	Rosaceae	<i>Cotoneaster</i>	
Cultivated hosts	Rosaceae	<i>Cydonia oblonga</i>	Quince
Cultivated hosts	Rosaceae	<i>Malus domestica</i>	Apple
Cultivated hosts	Rosaceae	<i>Prunus salicina</i>	Japanese plum
Cultivated hosts	Rosaceae	<i>Pyrus communis</i>	European pear
Cultivated hosts	Rosaceae	<i>Rosa</i>	Roses
Cultivated hosts	Rubiaceae	<i>Coffea</i>	Coffee
Cultivated hosts	Salicaceae	<i>Populus</i>	Popolars
Cultivated hosts	Sapindaceae	<i>Dimocarpus longan</i>	Longan tree
Cultivated hosts	Sapindaceae	<i>Dodonaea viscosa</i>	Switch sorrel
Cultivated hosts	Sapotaceae	<i>Manilkara zapota</i>	Sapodilla
Cultivated hosts	Vitaceae	<i>Vitis vinifera</i>	Grapevine
Cultivated hosts	Platanaceae	<i>Platanus</i>	Planes

Host status	Plant family	Host name	Common name
Wild host	Myrtaceae	<i>Syzygium cumini</i>	Black plum
Wild host	Myrtaceae	<i>Syzygium jambos</i>	Rose apple
Wild weed host	Vitaceae	<i>Ampelopsis aconitifolia</i>	Monkhood-vine
Wild weed hosts	Myrtaceae	<i>Melaleuca quinquenervia</i>	Paperbark tree
Unknown	Combretaceae	<i>Terminalia arjuna</i>	Arjun
Unknown	Menispermaceae	<i>Tinospora sinensis</i>	

## Appendix C – Import data

**Table C.1: Fresh or dried guavas, mangoes (CN code 080450)** imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source Eurostat accessed on 18/6/2021)

Country	2016	2017	2018	2019	2020	Sum 2016–2020
Brazil	1,025,325.37	1,158,717.06	1,241,860.63	1,437,569.20	1,576,540.49	6,440,012.75
Israel	143,726.08	140,551.30	108,353.48	121,875.16	98,185.83	612,691.85
Mali	72,965.87	53,045.00	68,743.59	91,829.06	85,458.70	372,042.22
United States	78,874.11	45,478.21	54,660.34	82,580.54	82,852.22	344,445.42
South Africa	8,550.13	13,015.45	9,739.99	12,116.95	8,515.14	51,937.66
India	5,989.34	8,148.87	9,470.36	9,315.51	7,347.61	40,271.69
Egypt	4,135.64	9,186.69	4,855.57	6,407.46	12,233.16	36,818.52
Sri Lanka	1,254.27	1,003.35	765.31	813.83	423.16	4,259.92
Uganda	257.30	452.71	360.01	662.25	389.56	2,121.83
Malawi		0.00			648.00	648.00
Mozambique		0.00	122.61	126.65	134.13	383.39
Kenya	232.06	4.08	65.09	10.30	66.53	378.06
Sudan	34.71	43.30	215.93	29.99	10.00	333.93
Turkey	0.12	0.21	24.09	68.86	38.93	132.21
United Arab Emirates	27.94	0.95	10.05		20.00	58.94
Tanzania		0.00	0.50	1.14		1.64
Tunisia	0.08	0.00				0.08

**Table C.2: Fresh or dried pistachios, in shell (CN code 080251)** imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source Eurostat accessed on 18/6/2021)

Country	2016	2017	2018	2019	2020	Sum 2016–2020
United States	346,787.62	543,547.63	523,093.94	718,669.61	674,398.39	2,806,497.19
Turkey	1,136.98	595.35	1,160.66	2,094.93	1,046.79	6,034.71
Syria	181.78	66.87	1,270.16	583.30	60.92	2,163.03
United Arab Emirates	0.29	6.46	295.28	390.12	0.11	692.26
South Africa		0.00		390.10	239.35	629.45
Egypt		0.00	107.00	199.58		306.58
Israel	0.21	0.95	195.30	2.70	0.38	199.54
Iraq			2.00	4.50	48.24	54.74
Tunisia		0.00	6.01		0.02	6.03
Uganda	0.39	1.26		2.40	0.24	4.29
India	0.03	0.03	0.01	0.37	1.30	1.74

**Table C.3: Coconuts, Brazil nuts and cashew nuts (. . .) (CN code 0801)** imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source Eurostat accessed on 18/6/2021)

Country	2016	2017	2018	2019	2020	Sum 2016–2020
India	170,399.32	243,346.77	192,497.06	205,693.06	172,116.59	984,052.80
Sri Lanka	129,125.94	70,924.94	57,516.21	76,430.04	60,597.68	394,594.81
Brazil	36,419.17	28,181.64	51,378.25	59,924.59	75,715.61	251,619.26
Mozambique	15,031.71	7,490.17	10,508.99	16,038.30	12,972.23	62,041.40

Country	2016	2017	2018	2019	2020	Sum 2016–2020
Tanzania	1,889.75	2,570.78	1,197.66	1,931.29	1,800.05	9,389.53
United States	2,447.78	1,994.95	1,377.75	511.55	845.48	7,177.51
Turkey	847.40	149.77	438.10	669.77	947.21	3,052.25
Kenya	17.01	696.35	57.73	244.49	1,191.89	2,207.47
Tunisia		270.02	32.73	509.85		812.60
Mali		232.21	97.80	1.00	132.01	463.02
South Africa	1.24	103.64	0.50	0.79	205.46	311.63
United Arab Emirates	0.87	18.36	0.25	10.78	24.81	55.07
Syria	0.60	2.23	12.37	17.80	1.25	34.25
Iraq		0.02		10.11	23.16	33.29
Israel	2.40	12.32	4.95	2.36	11.16	33.19
Egypt	4.20	3.23	2.77	14.96	0.84	26.00
Uganda		2.07	2.99	3.61	1.90	10.57
Somalia			0.10			0.10

**Table C.4: Fresh persimmons (CN code 081070) imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source Eurostat accessed on 18/6/2021)**

Country	2016	2017	2018	2019	2020	Sum 2016–2020
South Africa	823.16	817.79	206.08	7,857.42	4,974.49	14,678.94
Israel	2,404.45	3,231.29	1,158.64	181.58	3,211.13	10,187.09
Brazil	33.63	315.72	337.60	974.78	428.63	2,090.36
United Arab Emirates	169.14					169.14
Turkey	62.88	10.29	1.50		52.88	127.55

**Table C.5: Fresh, chilled, frozen or dried roots and tubers of manioc “cassava” (...)(CN code 071410) imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source: Eurostat accessed on 18/6/2021)**

Country	2016	2017	2018	2019	2020	Sum 2016–2020
India	2,396.37	2,290.83	1,264.71	1,369.01	2,135.28	9,456.2
Brazil	110.00	433.90	1,086.50	1,523.14	2,330.27	5,483.81
Uganda	24.32	32.88	29.28	77.85	40.66	204.99
Egypt		0.00			162.00	162
Kenya	45.95	0.00			1.28	47.23
Tunisia		10.00				10
Sri Lanka		0.00		0.48	1.83	2.31
United States		0.00		0.61		0.61



**Table C.6: Fresh or chilled beans "*Vigna spp., Phaseolus spp.*", shelled or unshelled (CN code 070820) imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source: Eurostat accessed on 18/6/2021)**

Country	2016	2017	2018	2019	2020	Sum 2016–2020
Egypt	182,893.44	177,138.11	162,939.58	127,521.78	157,669.35	808,162.26
Kenya	134,462.94	135,486.54	142,688.90	166,739.38	157,284.18	736,661.94
Turkey	4,801.10	4,457.53	4,515.38	4,307.52	7,482.94	25,564.47
Tanzania	3,245.32	2,246.54	747.92	887.08	1,043.53	8,170.39
India	295.23	345.15	281.29	413.13	234.25	1,569.05
Uganda	121.23	193.58	112.23	236.81	253.10	916.95
Sri Lanka	65.09	80.93	89.58	71.23	18.02	324.85
South Africa)	0.05	0.00	41.64	38.70	24.30	104.69
United Arab Emirates	0.75	0.00		0.60	59.70	61.05
Sudan		0.00	7.40	34.08		41.48
Israel		0.00		6.90	27.44	34.34
United States	0.09	5.45	7.37	0.01	0.02	12.94
Brazil		0.00		10.50		10.50
Mozambique	0.58	0.02				0.60
Tunisia		0.01				0.01

**Table C.7: Cotton linters (CN code 140420) imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source: Eurostat accessed on 18/6/2021)**

Country	2016	2017	2018	2019	2020	Sum 2016–2020
Turkey	40,881.83	115,022.78	88,098.66	82,852.55	81,157.09	408,012.91
Brazil	13,493.54	57,840.63	68,605.72	50,783.56	57,176.03	247,899.48
United States	56,181.45	32,472.85	16,629.25	7,933.06	19,150.08	132,366.69
Sri Lanka	0.00	0.00	246.68		7,135.16	7,381.84
India	1,136.10	589.38	487.65	735.71	2,148.17	5,097.01
Israel		2.15				2.15
Egypt		1.47			0.00	1.47
United Arab Emirates		0.00	0.34			0.34

**Table C.8: Bananas (CN code 0803) imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source: Eurostat accessed on 18/6/2021)**

Country	2016	2017	2018	2019	2020	Sum 2016–2020
Brazil	149,108.03	26,855.08	59,677.31	104,909.74	98,434.39	438,984.55
Uganda	11,334.28	6,614.39	7,443.04	9,553.75	11,214.00	46,159.46
Sri Lanka	1,187.82	2,177.81	2,087.47	2,760.36	2,522.84	10,736.30
India	515.19	445.99	571.13	607.74	1,418.91	3,558.96
Mozambique		0.00	2,010.72	664.56		2,675.28
South Africa	132.75	46.24	36.96	353.09	128.54	697.58
Turkey	202.06	0.00	210.60	0.14		412.80
Egypt	42.98	0.18	146.87			190.03
Tanzania	28.02	11.93	33.68	34.24	34.74	142.61
Kenya	1.90	0.72	6.15	11.23	14.95	34.95
United States	7.00	6.37	1.54	6.32	10.37	31.60
Israel	2.10	0.00			0.75	2.85
Syria					0.55	0.55
Mali		0.00			0.21	0.21

Country	2016	2017	2018	2019	2020	Sum 2016–2020
Sudan		0.00	0.20			0.20

**Table C.9: Apples, pears and quinces, fresh (CN code 0808)** imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source Eurostat accessed on 18/6/2021)

Country	2016	2017	2018	2019	2020	Sum 2016–2020
South Africa	1,164,025.27	1,011,262.28	990,044.81	849,034.61	912,428.20	4,926,795.17
Brazil	154,977.26	249,520.21	242,883.91	139,942.31	92,900.91	880,224.60
Turkey	67,931.70	92,652.43	156,573.18	131,122.23	216,684.72	664,964.26
Egypt	3,161.05	3,265.63	2,300.58		2,726.73	11,453.99
Israel	2,407.12	2,084.69	936.63	2,382.40	1,539.87	9,350.71
United States	214.52	1,038.38	3,347.23	12.54		4,612.67
Syria			585.00			585.00
Tunisia		152.00				152.00
India	2.01	0.00			0.45	2.46
Uganda		0.00	0.15			0.15
Sri Lanka		0.00		0.15		0.15

**Table C.10: Fresh plums (CN code 08094005)** imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source Eurostat accessed on 18/6/2021)

Country	2016	2017	2018	2019	2020	Sum 2016–2020
South Africa	259,282.23	283,934.63	258,257.47	197,059.92	219,213.38	1,217,748
Turkey	13,049.85	31,089.82	15,990.12	11,194.45	28,141.20	99,465.44
Tunisia		0.00	661.97			661.97
Israel	307.62	251.64	77.67	19.94		656.87
Egypt	1.60	430.50		0.08	0.71	432.89
Brazil		84.84	122.95			207.79
Syria				8.74		8.74
India		0.00	0.45			0.45
United States		0.00		0.29	0.08	0.37
Sri Lanka	0.15	0.00				0.15

**Table C.11: Fresh grapes (CN code 080610)** imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source: Eurostat accessed on 18/6/2021)

Country	2016	2017	2018	2019	2020	Sum 2016–2020
South Africa	1,246,017.02	1,392,515.89	1,420,569.43	1,397,681.57	1,397,869.88	6,854,653.79
India	640,933.67	827,467.67	722,802.04	950,910.96	733,881.71	3,875,996.05
Egypt	330,565.57	404,801.23	429,994.87	442,798.85	462,890.07	2,071,050.59
Turkey	298,205.16	375,776.41	227,616.42	272,447.02	287,021.27	1,461,066.28
Brazil	194,152.79	249,279.81	271,987.56	196,465.22	228,095.15	1,139,980.53
Israel	13,169.16	7,165.09	6,397.33	318.24	1,080.90	28,130.72
United States	1,714.93	8,868.74	4,413.37	1,866.20	1072.48	17,935.72
Tunisia	657.82	0.00	239.62	40.60	192.00	1,130.04
Kenya		0.00	186.96			186.96

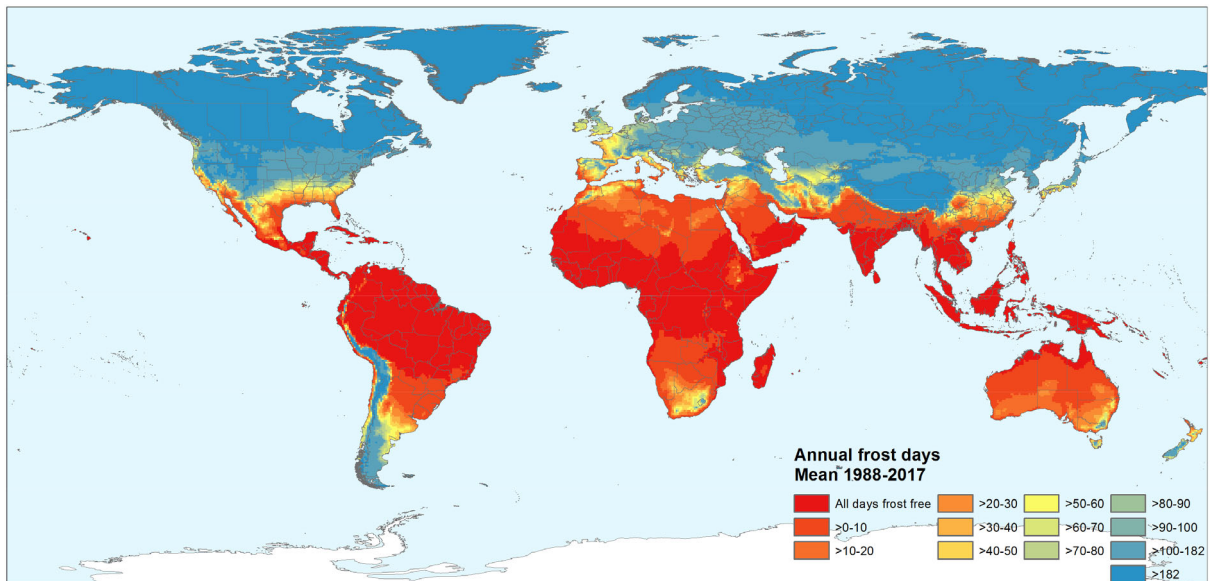
**Table C.12: Roses (CN code 060240)** imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source: Eurostat accessed on 18/6/2021)

Country	2016	2017	2018	2019	2020	Sum 2016–2020
South Africa	12.93	2.22	1,456.90	14.29	7.64	1,493.98
Israel		4.06	0.04	150.01		154.11
Turkey		94.96	0.85		8.85	104.66
Kenya	35.87		9.57	6.92	15.70	68.06
India	3.67	3.52	17.18	17.67	17.80	59.84
Sri Lanka	46.16					46.16
United States	6.32	5.15	5.28	1.34	0.61	18.70

**Table C.13: Figs fresh (CN code 08042010)** imported in 100 kg into the EU (27) from regions where *Retithrips syriacus* is known to occur (Source: Eurostat accessed on 18/6/2021)

Country	2016	2017	2018	2019	2020	Sum 2016–2020
Turkey	95,562.59	107,988.68	114,596.40	131,193.76	147,002.04	596,343.5
Brazil	8,888.47	10,560.50	10,755.17	10,622.06	9,115.87	49,942.07
Israel	2,316.88	1,300.18	1,406.99	859.53	604.66	6,488.24
South Africa	493.50	697.57	624.33	464.30	471.60	2,751.3
India	145.14	59.70	15.48	20.64	7.96	248.92
Tunisia	17.30	166.24	5.00	12.80	37.00	238.34
Egypt	7.46	10.53	13.41	44.08	60.26	135.74
Sri Lanka		0.40		93.87		94.27
Kenya		0.10				0.1
United States		0.00		0.04		0.04

## Appendix D – Annual frost days



Source: Climatic Research Unit high resolution gridded dataset CRU TS v. 4.03 at 0.5° resolution (<https://crudata.uea.ac.uk/cru/data/hrg/>).