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Pest categorisation of *Nipaecoccus viridis*

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Abstract

The EFSA Panel on Plant Health performed a pest categorisation of *Nipaecoccus viridis* (Hemiptera: Sternorrhyncha: Pseudococcidae), the spherical scale, for the EU. It is of Asian origin and occurs widely in southern Asia, Africa and tropical Australia. It has been introduced to a few countries in the Americas. In the Mediterranean basin it is found in Algeria, Egypt, Israel, Syria and Turkey, where it is limited to the Marmara region. It has not been reported within the EU. It is not listed in Annex II of Commission Implementing Regulation (EU) 2019/2072. It reproduces sexually, has three generations each year in citrus orchards in South Africa, and all stages can overwinter. First instar nymphs may move to neighbouring plants by crawling or be passively dispersed by wind or hitchhiking on clothing, equipment or animals. It is highly polyphagous, feeding on plants in 115 genera and 46 families. It is an important pest of citrus (*Citrus* spp.), cotton (*Gossypium* spp.), mango (*Mangifera indica*), avocado (*Persea americana*) and stored potatoes (*Solanum tuberosum*). It also feeds on a wide range of other fruit (apple *Malus domestica*, olive *Olea europea*, pear *Pyrus communis* and grape *Vitis vinifera*) and vegetable crops (tomato *Solanum lycopersicum*), and ornamental plants (roses, *Rosa* spp.) that are widely grown in the EU. Plants for planting, fruits, vegetables, and cut flowers are the main potential pathways for entry of *N. viridis* into the EU. Climatic conditions and availability of host plants in southern parts of the EU where there are few days of frost each year would likely allow this species to successfully establish and spread. Reductions in yield and quality of cultivated hosts including avocado, citrus, cotton and mango is anticipated if establishment occurs. Phytosanitary measures are available to reduce the likelihood of entry and spread. *N. viridis* meets the criteria that are within the remit of EFSA to assess for this species to be regarded as a potential Union quarantine pest.

Keywords: spherical mealybug, invasive species, 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-2021-00027 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

Nipaecoccus viridis is one of a number of pests listed in Annex 1D to the Terms of Reference (ToR) to be subject to pest categorisation to determine whether it fulfils the criteria of a potential Union quarantine pest (QP) for the area of the EU excluding Ceuta, Melilla and the outermost regions of Member States referred to in Article 355(1) of the Treaty on the Functioning of the European Union (TFEU), other than Madeira and the Azores, and so inform EU decision making as to its appropriateness for potential inclusion in the lists of pests of Commission Implementing Regulation (EU) 2019/2072. If a pest fulfils the criteria to be potentially listed as a Union QP, risk reduction options will be identified.

1.3. Additional information

This pest categorisation was initiated as a result of media monitoring, PeMoScoring and subsequent discussion in PAFF, resulting in it being included in the current mandate within the list of pests identified by horizon scanning and selected for pest categorisation.

2. Data and methodologies

2.1. Data

2.1.1. Literature search

A literature search on *N. viridis* 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 to TRACES in May 2020.

GenBank was searched to determine whether it contained any nucleotide sequences for *N. viridis* which could be used as reference material for molecular diagnosis. GenBank® (www.ncbi.nlm.nih.gov/genbank/) is a comprehensive publicly available database that as of August 2019 (release version 227) contained over 6.25 trillion base pairs from over 1.6 billion nucleotide sequences for 450,000 formally described species (Sayers et al., 2020).

2.2. Methodologies

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

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

The Panel's conclusions are formulated respecting its remit and particularly with regard to the principle of separation between risk assessment and risk management (EFSA founding regulation (EU) No 178/2002); therefore, instead of determining whether the pest is likely to have an unacceptable impact, deemed to be a risk management decision, the Panel will present a summary of the observed

impacts in the areas where the pest occurs, and make a judgement about potential likely impacts in the EU. 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 derived from Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest (article 3)
Identity of the pest (Section 3.1)	Is the identity of the pest clearly defined, or has it been shown to produce consistent symptoms and to be transmissible?
Absence/presence of the pest in the EU territory (Section 3.2)	Is the pest present in the EU territory? If present, is the pest in a limited part of the EU or is it scarce, irregular, isolated or present infrequently? If so, the pest is considered to be not widely distributed.
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	Is the pest able to enter into, become established in, and spread within, the EU territory? If yes, briefly list the pathways for entry and spread.
Potential for consequences in the EU territory (Section 3.5)	Would the pests' introduction have an economic or environmental impact on the EU territory?
Available measures (Section 3.6)	Are there measures available to prevent pest entry, establishment, spread or impacts?
Conclusion of pest categorisation (Section 4)	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential quarantine pest were met and (2) if not, which one(s) were not met.

3. Pest categorisation

3.1. Identity and biology of the pest

3.1.1. Identity and taxonomy

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

Yes, the identity of the species is established and *N. viridis* (Newstead) is the accepted name.

N. viridis (Newstead, 1894) is an insect in the order Hemiptera, suborder Sternorrhyncha, and family Pseudococcidae. It has many common names including coffee mealybug, cotton mealybug, hibiscus mealybug, globular coffee mealybug, karoo thorn mealybug, Lebbeck mealybug and spherical mealybug. However, the common name cotton mealybug is more commonly applied to *Phenacoccus solenopsis* Tinsley (EFSA PLH Panel, 2021) while hibiscus mealybug can be confused with pink hibiscus mealybug *Maconellicoccus hirsutus* (Green), as the mealybugs share many host plants (EFSA PLH Panel, 2022).

It was first described as *Dactylopius viridis* by Newstead (1894) from specimens collected in Madras, India, on *Hygrophila auriculata* (= *Hygrophila spinosa*). The main synonyms are: *Dactylopius perniciosus* Newstead & Willcocks; *Dactylopius vastator* Maskell; *Nipaecoccus vastator* (Maskell); *Pseudococcus filamentosus corymbatus* Green; *Pseudococcus perniciosus* Newstead; *Pseudococcus solitarius* Brain; *Pseudococcus theae* (Rutherford); *Pseudococcus vastator* (Maskell); *Pseudococcus viridis* (Newstead); *Ripersia theae* Rutherford; and *Trionymus sericeus* James. A comprehensive synonymy is provided by García Morales et al. (2016).

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

3.1.2. Biology of the pest

The biology of *N. viridis* was reviewed by Sharaf and Meyerdirk (1987). It reproduces sexually and each female lays 90–138 eggs. There are three immature instars in the female and four in the male and all stages can overwinter. Three generations per year are recorded in citrus orchards in South Africa (Cilliers and Bedford, 1978). The spring (September–October) generation of mature females lays eggs that hatch during October-November. The crawlers migrate and settle mainly in protected areas, under the sepals of the fruitlets when the fruit are pea-sized or larger. This second generation matures in November and lays eggs which hatch during December. The third generation of females matures in late summer-early autumn (March-April). In laboratory studies, *N. viridis* females can develop from egg to reproductive adult on citrus trees in approximately 19 days and the male can develop in 15 days at 32.5°C and 72.1% RH (Sharaf and Meyerdirk, 1987). There were significant positive correlations between population density and temperature, and negative correlations with relative humidity (Kondo and Watson, 2022).

More than 84 species of predators (mainly Coccinellidae) and parasitoids (mainly Encyrtidae) have been recorded for *N. viridis* (García Morales et al., 2016; Sharaf and Meyerdirk, 1987). Several of the predators and parasitoids of *N. viridis* are already present in the EU. The parasitoid *Anagyrus agraensis* Saraswat (Hymenoptera: Encyrtidae) has been successfully used for the biocontrol of the pest in Jordan and Israel. The wasp is not present in the EU but if the mealybug spreads to the EU, the parasitoid is likely to follow, or could be deliberately introduced. The ant species that attend and protect the mealybugs from natural enemies are discussed by Kondo and Watson (2022).

3.1.3. Host range/Species affected

N. viridis is highly polyphagous and has been recorded on hosts in 115 genera belonging to 46 plant families (García Morales et al., 2016; Kondo and Watson, 2022). Appendix A provides the full list of plant species reported to be hosts for *N. viridis*. Economically important crops in the EU include celery (*Apium graveolens*), asparagus (*Asparagus officinalis*), papaya (*Carica papaya*), citrus (*Citrus* spp.), common fig (*Ficus carica*), soybean (*Glycine max*), cotton (*Gossypium* spp.), sunflower (*Helianthus annuus*), apple (*Malus domestica*), mango (*Mangifera indica*), white mulberry (*Morus alba*), black mulberry (*Morus nigra*), olive (*Olea europea*), avocado (*Persea americana*), apricot (*Prunus armeniaca*), guava (*Psidium guajava*), pomegranate (*Punica granatum*), pear (*Pyrus communis*), tomato (*Solanum lycopersicon*), potato (*Solanum tuberosum*) and grape (*Vitis vinifera*). However, there is uncertainty regarding the impact of *N. viridis* on many of these hosts (see Section 3.5). Hosts also include ornamental plants found in the EU including chrysanthemums (*Chrysanthemum* spp.), hibiscus (*Hibiscus* spp.), myrtle (*Mrytus communis*), oleander (*Nerium oleander*), geranium (*Pelargonium* spp.) and roses (*Rosa* spp.).

3.1.4. Intraspecific diversity

No intraspecific diversity is reported for this species.

3.1.5. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes. There are methods available for detection, and morphological and molecular identification of *N. viridis*.

Detection

Careful visual examination of plants is an effective way for the detection of the insect. The white waxy covering of the mealybugs and the waxy ovisacs allow detection (Figure 1). They are often gregarious,

[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 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).

and clusters of the mealybugs can be conspicuous on above-ground new growth and fruit. The adult waxy secretions may appear to form a continuous layer over the cluster making it difficult to discern individual mealybugs (Kondo and Watson, 2022). In contrast, they may also hide in cracks and crevices on the plant bark and under the sepals of fruits, making detection of early infestations difficult.

N. viridis can be confused with other scale insects in the field. For example, it was confused with cottony cushion scale *Icerya purchasi* Maskell (Hemiptera: Sternorrhyncha: Monophlebidae) in commercial citrus orchards in Florida (Diepenbrock and Ahmed, 2020), it should be noted that *I. purchasi* is common in the EU.

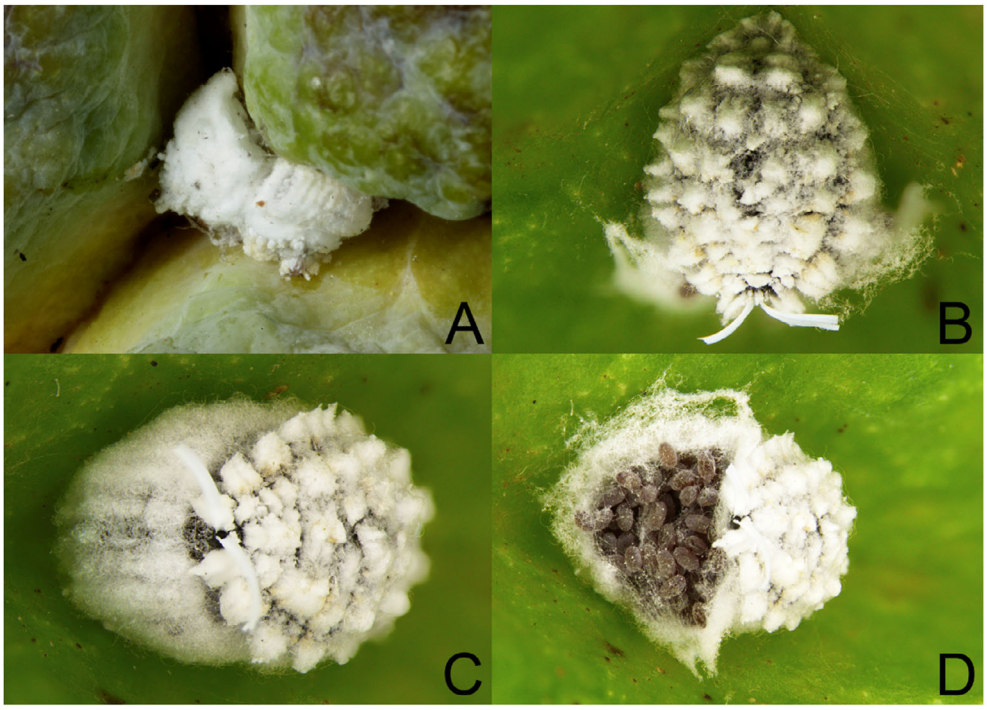

Figure 1: *Nipaecoccus viridis*: (A) adult females and ovisacs hidden in the crevices on *Annona squamosa* fruit; (B) adult female, dorsal view, on *Citrus macroptera* fruit; (C) adult female with ovisac developing on the left and lifting the female body off the surface of the fruit by almost 90 degrees; (D) ovisac opened to reveal the dark purple eggs. Adult female body length about 4 mm (source: Chris Malumphy)

Symptoms

The main symptoms of *N. viridis* infestation are:

- General weakening of the host due to sap removal.
- Defoliation, dieback and mortality of young plants.
- Citrus foliage and fruit can be severely distorted.
- Plants become covered in sooty moulds that grow on the honeydew egested by the mealybugs.
- Plants may also become contaminated with wax, particularly from the sticky ovisac wax.

With the exception of the white wax contamination and distortion of citrus fruit and foliage, these symptoms are similar to those caused by many other phloem-feeding insects and should not be considered as diagnostic

Identification

The identification of *N. viridis* requires microscopic examination of slide-mounted adult females and verification of the presence of key morphological characteristics as given in Ghosh and Ghose (1989), Williams (1985, 2004), and Kondo and Watson (2022). Joshi et al. (2021) provide photographs and keys for the identification of live and slide-mounted adult females of 10 species of mealybug infesting cassava in India. This includes *N. viridis* and several other polyphagous, widespread species that share

many of the same host species. The adult male and immature stages of *N. viridis* have been described by Ghosh and Ghose (1989). Molecular techniques based on cytochrome-oxidase 1 (COI) have also been developed by Gaines et al. (2022) for species identification.

Description

The main morphological characters are:

- Adult female oval and flattish initially, becoming globular with maturity, up to 4 mm long and 3 mm wide; body contents black to dark purple; body covered with thick white wax (Figure 1B) which may become pale-yellow over time.
- The ovisac of sticky white wax forms under the abdomen; when full of eggs, it lifts the abdomen of the adult female up to a steep angle, often almost 90 degrees, to the plant surface (Figure 1C).
- Eggs (Figure 1D) and first-instar nymphs are purple.
- The protective wax cover for male prepupa and pupa occurs on the foliage; it is parallel sided, formed from white wax filaments, and about 2 mm long.

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

N. viridis is mainly a tropical species of Asian origin. It is widespread in southern Asia, Africa and tropical Australia; it has been introduced to a few countries in the Americas (Figure 2). *N. viridis* was first recorded in Egypt a century ago (Hall, 1923), yet it only spread to neighbouring Israel in the 1980s (Ben-Dov et al., 1985), and was recently found in Turkey (Ülgentürk et al., 2022). In the Mediterranean basin, it is also present in Algeria and Syria. For a detailed list of countries where *N. viridis* is present, see Appendix B.

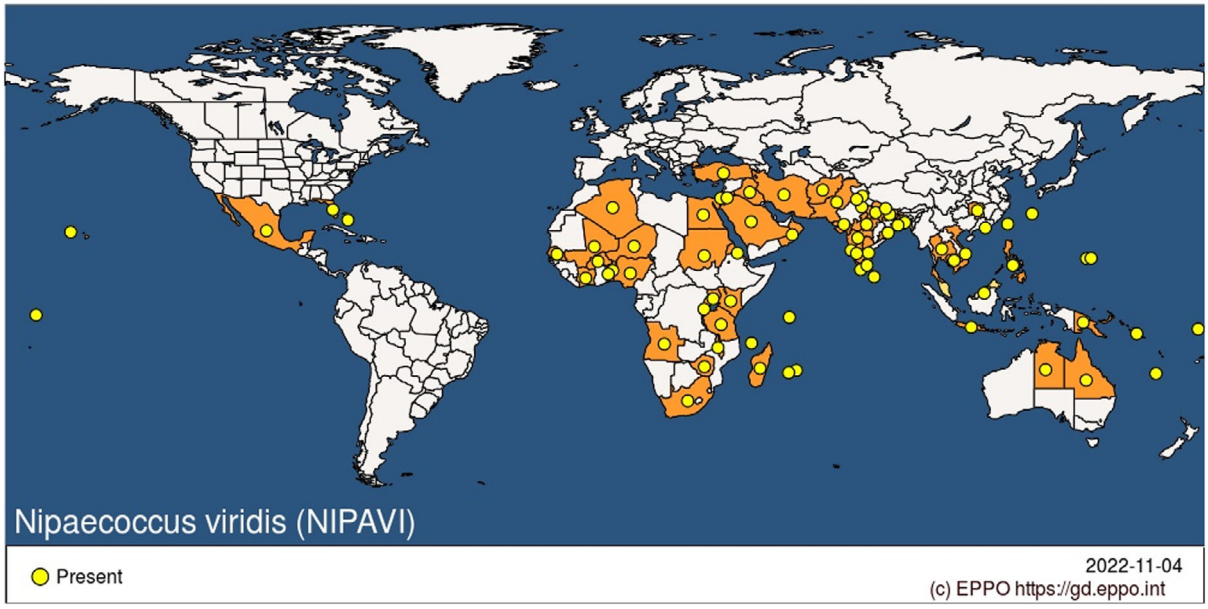

Figure 2: Global distribution of *Nipaecoccus viridis* (Source: EPPO Global Database accessed on 04/11/22)

3.2.2. Pest distribution in the EU

Is the pest present in the EU territory? If present, is the pest in a limited part of the EU or is it scarce, irregular, isolated or present infrequently? If so, the pest is considered to be not widely distributed.

No, *N. viridis* is not known to be present in the EU.

3.3. Regulatory status

3.3.1. Commission Implementing Regulation 2019/2072

N. viridis is not listed in Annex II of Commission Implementing Regulation (EU) 2019/2072, an implementing act of Regulation (EU) 2016/2031, or in any emergency plant health legislation.

3.3.2. Hosts or species affected that are prohibited from entering the Union from third countries

According to the Commission Implementing Regulation (EU) 2019/2072, Annex VI, introduction of several *N. viridis* hosts in the Union from certain third countries is prohibited (Table 2).

Plants for planting of *Acacia* Mill., *Albizia* Durazz., *Annona* L., *Caesalpinia* L., *Diospyros* L., *Ficus* L., *Ligustrum* L., *Malus* Mill., *Persea* Mill., *Prunus* L. and *Robinia* L., which are hosts of *N. viridis* (Appendix A) are considered High Risk Plants for the EU and their import is prohibited pending country-specific commodity risk assessment (EU 2018/2019).

Table 2: List of plants, plant products and other objects that are *Nipaecoccus viridis* 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**
1.	Plants of [. . .]., *Pinus* L., [. . .]., other than fruit and seeds	ex 0602 20 20 ex 0602 20 80 ex 0602 90 41 ex 0602 90 45 ex 0602 90 46 ex 0602 90 47 ex 0602 90 50 ex 0602 90 70 ex 0602 90 99 ex 0604 20 20 ex 0604 20 40	Third countries other than Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canary Islands, Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, Russia (only the following parts: Central Federal District (Tsentralny federalny okrug), Northwestern Federal District (Severo- Zapadny federalny okrug), Southern Federal District (Yuzhny federalny okrug), North Caucasian Federal District (Severo-Kavkazsky federalny okrug) and Volga Federal District (Privolzhsky federalny okrug)), San Marino, Serbia, Switzerland, Turkey, Ukraine and the United Kingdom
8.	Plants for planting of [. . .]., *Malus* Mill., *Prunus* L., *Pyrus* L. and *Rosa* 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, Ukraine and the United Kingdom
9.	Plants for planting of *Cydonia* Mill., *Malus* Mill., *Prunus* L. and *Pyrus* L. and their hybrids, and [. . .], 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	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

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
		ex 0602 90 99	Caucasian Federal District (Severo- Kavkazsky federalny okrug) and Volga Federal District (Privolzhsky federalny okrug)), San Marino, Serbia, Switzerland, Syria, Tunisia, Turkey, Ukraine, the United Kingdom (1) and United States other than Hawai
10.	Plants of *Vitis* L., other than fruits	0602 10 10 0602 20 10 ex 0604 20 90 ex 1404 90 00	Third countries other than Switzerland
11.	Plants of *Citrus* L., [...]., and their hybrids, other than fruits and seeds	ex 0602 10 90 ex 0602 20 20 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
15	Tubers of *Solanum tuberosum* L., seed potatoes*	0701 10 00	Third countries other than Switzerland
16.	Plants for planting of stolon- or tuber-forming species of *Solanum* L. or their hybrids, other than those tubers of *Solanum tuberosum* L. as specified in entry 15	ex 0601 10 90 ex 0601 20 90 ex 0602 90 50 ex 0602 90 70 ex 0602 90 91 ex 0602 90 99	Third countries other than Switzerland
17.	Tubers of species of *Solanum* L., and their hybrids, other than those specified in entries 15 and 16	ex 0601 10 90 ex 0601 20 90 0701 90 10 0701 90 50 0701 90 90	Third countries or regions other than: (a) Algeria, Egypt, Israel, Libya, Morocco, Syria, Switzerland, Tunisia and Turkey; or (b) those which fulfil the following: (i) they are one of following: Albania, Andorra, Armenia, Azerbaijan, Belarus, Canary Islands, Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, 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 and Ukraine; and (ii) they fulfil one of the following: — they are recognised as being free from Clavibacter sepedonicus (Spieckermann and Kotthoff) Nouioui et al., in accordance with the procedure referred to in Article 107 of Regulation (EU) 2016/2031, or their legislation is recognised as equivalent to the Union rules concerning protection against Clavibacter sepedonicus (Spieckermann and Kotthoff) Nouioui et al. in accordance with the procedure referred to in Article 107 of Regulation (EU) 2016/2031; or (c) Bosnia and Herzegovina, Montenegro, Serbia and the United Kingdom (1), provided the following condition is

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**
			fulfilled: the submission by those third countries to the Commission, by 30 April of each year, of survey results of the previous year confirming that Clavibacter sepedonicus (Spieckermann and Kotthoff) Nouioui et al. is not present on their territories
18.	Plants for planting of Solanaceae other than seeds and the plants covered by entries 15, 16 or 17	ex 0602 90 30 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 ex 0602 10 90	Third countries other than: Albania, Algeria, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canary Islands, Egypt, Faeroe Islands, Georgia, Iceland, Israel, Jordan, Lebanon, Libya, Liechtenstein, Moldova, Monaco, Montenegro, Morocco, 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 the United Kingdom

*: *N. viridis* is a pest of stored potato tubers in Asia but is very unlikely to be found on seed potatoes.

3.4. Entry, establishment and spread in the EU

3.4.1. Entry

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

Yes, pathways for entry into the EU territory exist via plants for planting, fruit, cut flowers, and vegetables, although some host plants for planting are prohibited, closing some potential pathways (Table 3).

Comment on plants for planting as a pathway.

Plants for planting (excluding seeds) would be the primary pathway for entry (Table 3).

N. viridis can spread over long distances through plants for planting, fruit, cut flowers, and vegetables (Table 3).

No specific requirements are set for *N. viridis*. As not all, but only a proportion of imported consignments are liable to be physically inspected, the requirements summarised in Table 3 do not preclude the entry of *N. viridis*.

Table 3: Potential pathways for *Nipaecoccus viridis* into the EU

Pathways (e.g. host/ intended use/source)	**Life stage**	**Relevant mitigations [e.g. prohibitions (Annex VI), special requirements (Annex VII) or phytosanitary certificates (Annex XI) within Implementing Regulation 2019/2072]**
Plants for planting	Eggs, nymphs, adult females	The import of some host plants of *N. viridis* for planting from all or certain third countries is not allowed (Regulation 2019/2072, Annex VI), while there are many other hosts that can be imported to the EU with a phytosanitary certificate.
Fresh fruits and vegetables, and cut flowers	Eggs, nymphs, adult females	A phytosanitary certificate is required to import fresh fruits and vegetables, and cut flowers into the EU (2019/2072, Annex XI, Part A and B) unless exempt by being listed in 2019/2072 Annex XI, Part C.

Annual imports of *N. viridis* hosts from countries where the pest is known to occur are provided in Appendix C with total imports shown in Table 4 below (Table C.1–C.21).

Table 4: EU imports of *Nipaecoccus viridis* hosts 2016–2020 (Source: EUROSTAT; in hundreds of kg)

Crops	2016	2017	2018	2019	2020
Soya beans, whether or not broken	53,494,472	47,824,702	74,966,338	68,291,705	49,452,878
Coffee, whether or not roasted or decaffeinated; coffee husks and skins; coffee substitutes containing coffee in any proportion	12,482,224	12,148,510	12,624,998	12,249,202	11,824,107
Potatoes, fresh or chilled	2,860,992	3,434,079	3,003,074	4,199,875	3,542,514
Grapes, fresh or dried	3,098,466	3,329,071	3,245,073	3,584,443	3,517,427
Fresh or dried grapefruit	2,321,979	2,493,519	2,473,050	2,432,975	2,365,773
Coconuts, Brazil nuts and cashew nuts, fresh or dried, whether or not shelled or peeled	2,006,480	2,145,538	2,138,013	2,238,882	2,355,408
Fresh or dried avocados	1,504,157	1,478,278	1,989,007	2,049,056	2,007,256
Fresh or dried lemons "Citrus limon, Citrus limonum"	477,586	594,392	862,762	969,365	1,507,425
Fresh or dried guavas, mangoes and mangosteens	770,133	770,026	819,623	893,079	758,329
Fresh pears	968,156	858,536	774,153	674,488	683,078
Fresh or dried dates	444,823	545,344	566,712	586,247	686,948
Fresh or dried limes "Citrus aurantifolia, Citrus latifolia"	441,370	462,663	567,649	410,027	340,818
Fresh apples	319,435	263,465	369,165	269,200	341,461
Fresh tamarinds, cashew apples, lychees, jackfruit, sapodillo plums, passion fruit, carambola and pitahaya	285,469	275,602	284,775	290,278	236,695
Tomatoes, fresh or chilled	118,141	87,567	107,723	98,011	84,342
Fresh or chilled asparagus	40,277	42,947	42,064	47,221	40,110
Fresh, chilled, frozen or dried roots and tubers of manioc "cassava", whether or not sliced or in the form of pellets	16,187	13,681	24,580	53,683	75,959
Fresh or chilled aubergines "eggplants"	15,883	18,917	21,105	22,041	23,669
Fresh pawpaws "papayas"	11,795	13,495	14,432	14,757	11,473
Cucumbers and gherkins, fresh or chilled	11,257	14,260	15,059	12,859	8,586
Fresh persimmons	3,245	4,049	1,371	8,040	8,226
Fresh figs	3,058	2,283	2,226	1,608	1,248
Fresh or chilled celery (excl. celeriac)	183	571	336	505	467
Fresh quinces	192	420	2	19	766
Fresh or chilled olives (excl. for oil production)	73	19	33	91	141

Notifications of interceptions of harmful organisms began to be compiled in Europhyt in May 1994 and in TRACES in May 2020. As at 1 December 2022, there were 0 records of interception of *N. viridis* in the Europhyt and TRACES databases.

In the UK, there were 35 interceptions of *N. viridis* between 2002 and 2018, mostly on fresh *Citrus* fruits from Bangladesh. In almost all cases this was *Citrus macroptera*, commonly known as Bangladeshi lemons, Jara lemons, wild oranges and Shatkora, and frequently misidentified as lemon or lime in trade. *N. viridis* was also found on *Annona* fruits from India and Pakistan, citrus fruits from Pakistan and Thailand, *Citrus hystrix* leaves from Thailand, guava fruits from Pakistan, mango fruits from India and Pakistan, and fresh *Houttuynia* leaves (edible and medicinal herb) from Laos. In several cases, the plant material was heavily infested with mealybugs (Fera unpublished records). No action was taken against these findings and so no notifications were made to Europhyt.

3.4.2. Establishment

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

Yes, *N. viridis* could establish in parts of the EU territory as there are climatic conditions that are similar to those in areas where the pest occurs, and potential hosts are present.

The area of the EU most suitable for establishment is in the southern EU around the Mediterranean Sea.

Unless moved with plants for planting, there are uncertainties over the pests' ability to transfer to a suitable host following arrival into the EU. However, the high polyphagy of this mealybug could increase the changes of successful transfer even for colonies on fruit, vegetables, or cut flowers. Uncertainties also include its ability to find a mate and other Allee effects (effects causing reduced survival of new colonies with a small number of individuals) (Tobin et al., 2011) as well as the impact of natural enemies in the EU.

3.4.2.1. EU distribution of main host plants

N. viridis is a polyphagous pest. The main hosts of the pest cultivated in the EU 27 between 2016 and 2020 are shown in Table 5. Among others, apples, apricots, asparagus, avocados, celery, citrus, cucumbers, eggplants, figs, grapes, olives, pears, tomatoes and ornamental plants are important crops in the EU.

Table 5: Harvested area of important *N. viridis* hosts in EU 27, 2016-2020 (thousand ha) (Eurostat accessed on 13 June 2022)

Crop	Eurostat code	2016	2017	2018	2019	2020
Olives	O1000	5,043.87	5,056.93	5,098.62	5,071.59	5,106.54
Grapes	W1000	3,136.15	3,133.32	3,135.50	3,155.20	3,156.21
Citrus fruits	T0000	519.01	502.84	508.99	512.83	519.98
Apples	F1110	505.66	504.61	506.27	491.08	482.99
Tomatoes	V3100	253.95	247.95	239.48	242.52	233.19
Pears	F1120	115.13	113.81	113.54	110.66	107.04
Apricots	F1230	72.52	72.23	72.57	73.22	76.12
Asparagus	V2600	56.42	59.05	60.04	58.94	59.10
Cucumbers	V3200	32.34	31.81	32.65	33.70	27.78
Figs	F2100	23.74	24.63	24.99	25.59	27.21
Eggplants	V3410	21.48	20.73	21.24	20.61	21.14
Avocados	F2300	12.24	12.72	13.22	17.50	19.63
Celery	V2200	7.42	7.65	:	:	:

':' data not available.

3.4.2.2. Climatic conditions affecting establishment

N. viridis occurs mainly in tropical and subtropical regions in Asia, Africa and Oceania. It has been present in Egypt for more than a hundred years and has recently been found in Turkey. The thermal biology of this pest is little studied and no temperature thresholds for development have been reported. Consequently, there is some uncertainty regarding the climatic requirements of the pest. Figure 3 shows the world distribution of Köppen–Geiger climate types (Kottek et al., 2006) that occur in the EU and which occur in countries where *N. viridis* has been reported. Southern EU countries may provide suitable climatic conditions for the establishment of *N. viridis*. As a tropical and sub-tropical organism, low temperatures, as indicated by frost, may limit establishment. Figure 4 shows frost free areas in the EU which could perhaps be colonised by *N. viridis*. Data for Figure 4 represents the 30-year period 1988–2017 and was 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/).

Establishment outdoors in central and northern Europe is very unlikely. Nevertheless, there is a possibility that *N. viridis* could occur in greenhouses and on indoor plantings in such areas. The congeneric coconut mealybug or spiked mealybug *N. nipae* (Maskell) is well established in botanic greenhouses in Europe.

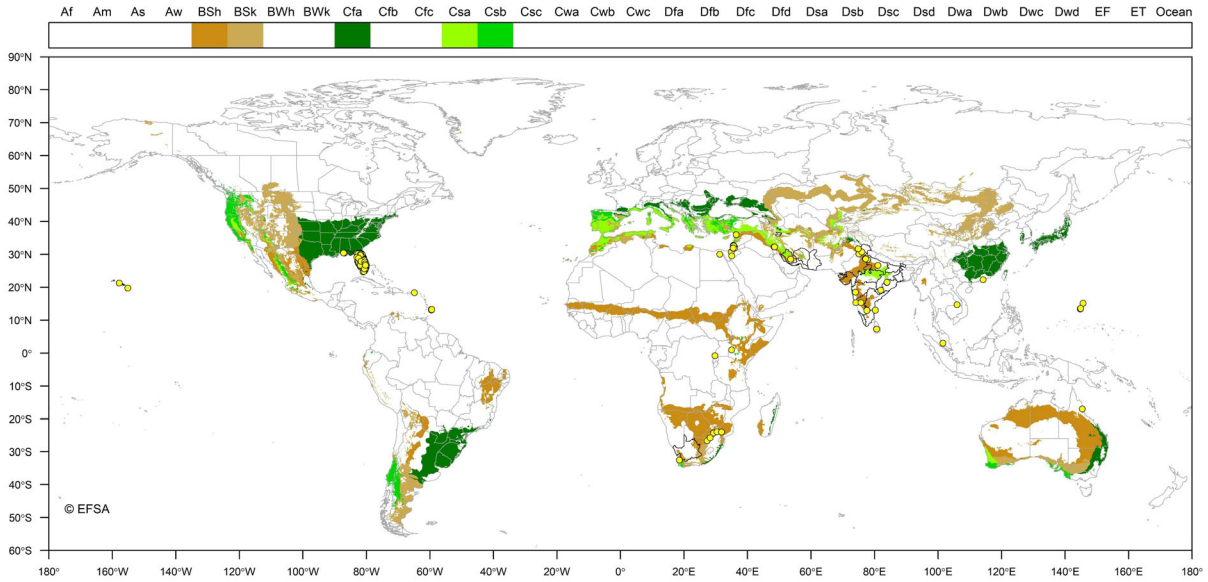

Figure 3: World distribution of selected Köppen–Geiger climate types which occur in the EU and in countries where *Nipaecoccus viridis* has been reported. Yellow dots indicate precise records for *N. viridis*

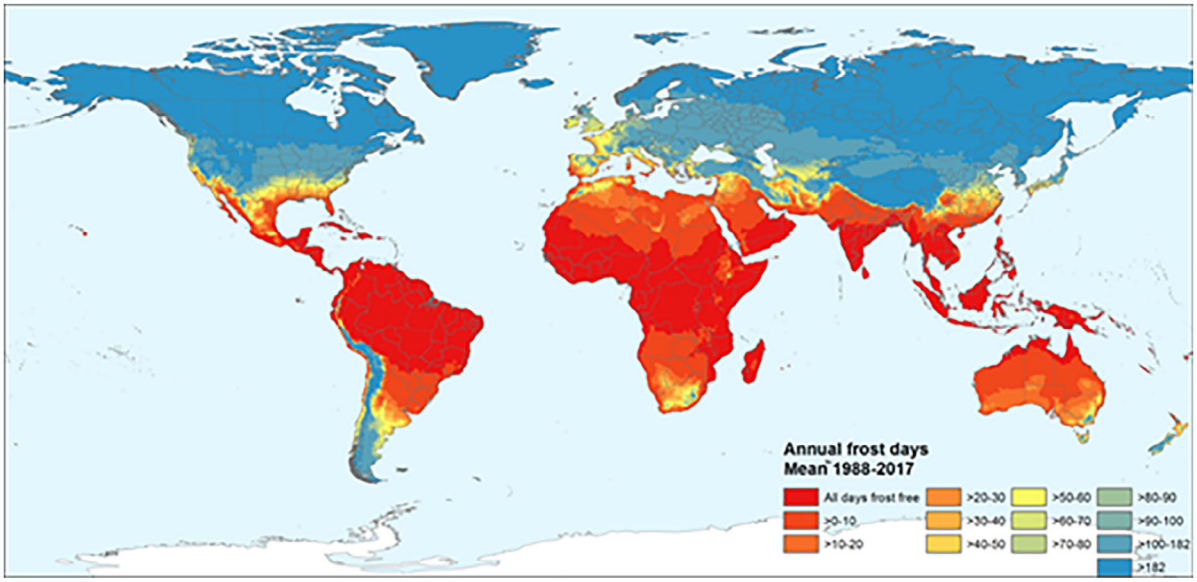

Figure 4: Annual frost days in the world (mean 1988–2017) (source: Climatic Research Unit, University of East Anglia, UK)

3.4.3. Spread

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

Natural spread by first instar nymphs crawling or being carried by wind, other animals, or machinery, will occur locally and relatively slowly. All stages may be moved over long distances in trade of infested plant materials, specifically plants for planting, fruits, vegetables, and cut flowers.

Comment on plants for planting as a mechanism of spread. Plants for planting provide the main spread mechanism for *N. viridis* over long distances.

First instar nymphs may move to neighbouring plants by crawling or be passively dispersed by wind or hitchhiking on clothing, equipment or animals (Kondo and Watson, 2022). The wax forming the ovisac is sticky and can be drawn out into a string when touched. When samples are handled in the laboratory, parts of the ovisac with eggs can easily stick to and be spread on equipment. It is not known if eggs can be spread this way in nature.

Plants for planting, fruits, vegetables and cut flowers are the main pathways of spread of *N. viridis* over long distances.

3.5. Impacts

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

Yes, if *N. viridis* established in the EU, it would most probably have an economic impact.

N. viridis feeds on phloem sap, weakening the host plant. It egests sugary honeydew on which sooty moulds develop, which can interfere with photosynthesis, reducing market value of nursery stock and fruits. It is known as a pest of avocado, citrus, cotton, mango, soursop, and stored potatoes (Kondo and Watson, 2022). It has recently been found in commercial citrus orchards in Florida (USA), where it is having a significant impact (Diepenbrock and Ahmed, 2020). Infestations have been documented both in mature citrus groves with damage to fruit, and in young, replanted trees. Feeding damage includes distorted fruit and leaves, branch dieback, and even tree death in young, recently planted trees. The recent introduction in Florida of exclusion bags on newly planted citrus trees to prevent access by Asian citrus psyllid (*Diaphorina citri* Kuwayama (Hemiptera: Psyllidae)), the vector of the pathogen associated with citrus greening disease, has exacerbated the impact of the mealybug because natural enemies were also excluded (Diepenbrock and Ahmed, 2020). *N. viridis* was a serious pest of citrus and *Ziziphus* in Jordan in the 1980s, and infestations could result in total crop loss. However, the release of the biocontrol agent *A. agraensis* (= *A. indicus* Shafee, Alam and Agarwal) has resulted in good control of the mealybug (Williams, 2004). *N. viridis* is one of the main pests of mango in Okinawa, Japan, and a pest of stored potatoes and cotton in Asia (Williams, 2004).

N. viridis has a wide host range including many economically important crops and ornamentals grown in the EU (listed in Section 3.1.3) but there appear to be no published records of harmful impacts to many of these plants.

There seem to be suitable areas in the EU, where *N. viridis* could become abundant and harmful, particularly in the southern EU around the Mediterranean.

3.6. Available measures and their limitations

Are there measures available to prevent pest entry, establishment, spread or impacts such that the risk becomes mitigated?

Yes. Although the existing phytosanitary measures identified in Section 3.3.2 do not specifically target *N. viridis*, they mitigate the likelihood of its entry, establishment and spread within the EU (see also Section 3.6.1).

3.6.1. Identification of potential additional measures

Phytosanitary measures (prohibitions) are currently applied to some host plants for planting (see 3.3.2).

Additional potential risk reduction options and supporting measures are shown in sections 3.6.1.1. and 3.6.1.2.

3.6.1.1. Additional potential risk reduction options

Potential additional control measures are listed in Table 6.

Table 6: Selected control measures (a full list is available in EFSA PLH Panel, 2018) for pest entry/establishment/spread/impact in relation to currently unregulated hosts and pathways. Control measures are measures that have a direct effect on pest abundance

Control measure/Risk reduction option (Blue underline = Zenodo doc, Blue = WIP)	RRO summary	Risk element targeted (entry/establishment/spread/impact)
Require pest freedom	Pest free place of production (e.g. place of production and its immediate vicinity is free from pest over an appropriate time period, e.g. since the beginning of the last complete cycle of vegetation, or past 2 or 3 cycles). Pest free production site.	Entry/Spread/Impact
Growing plants in isolation	Place of production is insect proof originate in a place of production with complete physical isolation E.g. a dedicated structure such as glass or plastic greenhouses producing vegetables or flowers.	Entry/Spread
Managed growing conditions	Used to mitigate likelihood of infestation at origin. Plants collected directly from natural habitats, have been grown, held and trained for at least a year prior to dispatch in officially registered nurseries, which are subject to an officially supervised control regime.	Entry/Spread
Biological control and behavioural manipulation	There is an extensive list of natural enemies recorded for *N. viridis* (Kondo and Watson, 2022) and it has been successfully controlled in Jordan by the release of *A. agraensis*. In southern India, it is controlled by the parasitoid *Anagyrus dactylopii* (Howard) (Hymenoptera: Encyrtidae) and the predator *Domomyza perspicax* (Knab) (= *Gitona perspicax*) (Diptera: Drosophilidae) (Kondo and Watson, 2022).	Spread/Impact
Chemical treatments on crops including reproductive material	Chemical control of *Nipaecoccus* spp. is discussed by Kondo and Watson (2022).	Entry/Establishment/Spread/Impact
Chemical treatments on consignments or during processing	Use of chemical compounds that may be applied to plants or to plant products after harvest, during process or packaging operations and storage. The relevant treatments addressed in this information sheet are: a) fumigation; b) spraying/dipping pesticides;	Entry/Spread
Physical treatments on consignments or during processing	This information sheet deals with the following categories of physical treatments: irradiation/ionisation; mechanical cleaning (brushing, washing); sorting and grading, and; removal of plant parts.	Entry/Spread
Cleaning and disinfection of facilities, tools and machinery	The physical and chemical cleaning and disinfection of facilities, tools, machinery, transport means, facilities and other accessories (e.g. boxes, pots, pallets, palox, supports, hand tools). The measures addressed in this information sheet are: washing, sweeping and fumigation.	Spread
Heat and cold treatments	Controlled temperature treatments aimed to kill or inactivate pests without causing any unacceptable prejudice to the treated material itself.	Entry/Spread

3.6.1.2. Additional supporting measures

Potential additional supporting measures are listed in Table 7.

Table 7: Selected supporting measures (a full list is available in EFSA PLH Panel, 2018) in relation to currently unregulated hosts and pathways. Supporting measures are organisational measures or procedures supporting the choice of appropriate risk reduction options that do not directly affect pest abundance

Supporting measure (Blue underline = Zenodo doc, Blue = WIP)	Summary	Risk element targeted (entry/ establishment/ spread/impact)
Inspection and trapping	Inspection is defined as the official visual examination of plants, plant products or other regulated articles to determine if pests are present or to determine compliance with phytosanitary regulations (ISPM 5). The effectiveness of sampling and subsequent inspection to detect pests may be enhanced by including trapping and luring techniques.	Entry/Establishment/ Spread/Impact
Laboratory testing	Examination, other than visual, to determine if pests are present using official diagnostic protocols. Diagnostic protocols describe the minimum requirements for reliable diagnosis of regulated pests.	Entry/Spread
Sampling	According to ISPM 31, it is usually not feasible to inspect entire consignments, so phytosanitary inspection is performed mainly on samples obtained from a consignment. It is noted that the sampling concepts presented in this standard may also apply to other phytosanitary procedures, notably selection of units for testing. For inspection, testing and/or surveillance purposes the sample may be taken according to a statistically based or a non-statistical sampling methodology.	Entry
Phytosanitary certificate and plant passport	An official paper document or its official electronic equivalent, consistent with the model certificates of the IPPC, attesting that a consignment meets phytosanitary import requirements (ISPM 5) a) export certificate (import) b) plant passport (EU internal trade)	Entry/Spread
Certified and approved premises	Mandatory/voluntary certification/approval of premises is a process including a set of procedures and of actions implemented by producers, conditioners and traders contributing to ensure the phytosanitary compliance of consignments. It can be a part of a larger system maintained by the NPPO in order to guarantee the fulfilment of plant health requirements of plants and plant products intended for trade. Key property of certified or approved premises is the traceability of activities and tasks (and their components) inherent the pursued phytosanitary objective. Traceability aims to provide access to all trustful pieces of information that may help to prove the compliance of consignments with phytosanitary requirements of importing countries.	Entry/Spread
Certification of reproductive material (voluntary/official)	Plants come from within an approved propagation scheme and are certified pest free (level of infestation) following testing; Used to mitigate against pests that are included in a certification scheme.	Entry/Spread

Supporting measure (Blue underline = Zenodo doc, Blue = WIP)	Summary	Risk element targeted (entry/ establishment/ spread/impact)
Delimitation of Buffer zones	ISPM 5 defines a buffer zone as "an area surrounding or adjacent to an area officially delimited for phytosanitary purposes in order to minimise the probability of spread of the target pest into or out of the delimited area, and subject to phytosanitary or other control measures, if appropriate" (ISPM 5). The objectives for delimiting a buffer zone can be to prevent spread from the outbreak area and to maintain a pest free production place (PFPP), site (PFPS) or area (PFA).	Spread
Surveillance	Surveillance for early detection of outbreaks	Entry/Spread

3.6.1.3. Biological or technical factors limiting the effectiveness of measures

- *N. viridis* is polyphagous, making the inspections of all consignments containing hosts from countries where the pest occurs difficult.
- Limited effectiveness of contact insecticides due to the presence of protective wax cover
- Difficulty in detecting early infestations

3.7. Uncertainty

No key uncertainties of the assessment have been identified.

4. Conclusions

N. viridis satisfies all the criteria that are within the remit of EFSA to assess for it to be regarded as a potential Union quarantine pest (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
Identity of the pest (Section 3.1)	The identity of *N. viridis* is established. Taxonomic keys based on morphology of adults exist. There are also molecular techniques for species identification.	None
Absence/presence of the pest in the EU (Section 3.2)	No, *N. viridis* is not known to occur in the EU.	None
Pest potential for entry, establishment and spread in the EU (Section 3.4)	*N. viridis* is able to enter, become established and spread within the EU territory especially in the southern EU MS. The main pathways for entry are plants for planting, cut flowers, fruits, and vegetables.	None
Potential for consequences in the EU (Section 3.5)	The introduction of the pest could cause yield and quality losses on several crops and reduce the value of ornamental plants.	None
Available measures (Section 3.6)	There are measures available to prevent entry, establishment and spread of *N. viridis* in the EU. Risk reduction options include inspections, chemical and physical treatments on consignments of fresh plant material from infested countries and the production of plants for import in the EU in pest free areas.	None
Conclusion (Section 4)	*N. viridis* satisfies all the criteria that are within the remit of EFSA to assess for it to be regarded as a potential Union quarantine pest	

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Key uncertainties
Aspects of assessment to focus on/scenarios to address in future if appropriate:		

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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
PZ	Protected Zone
TFEU	Treaty on the Functioning of the European Union
ToR	Terms of Reference

Glossary

Containment (of a pest)	Application of phytosanitary measures in and around an infested area to prevent spread of a pest (FAO, 2021).
Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 2021).
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, 2021).
Eradication (of a pest)	Application of phytosanitary measures to eliminate a pest from an area (FAO, 2021).
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2021).
Greenhouse	A walk-in, static, closed place of crop production with a usually translucent outer shell, which allows controlled exchange of material and energy with the surroundings and prevents release of plant protection products (PPPs) into the environment.
Hitchhiker	An organism sheltering or transported accidentally via inanimate pathways including with machinery, shipping containers and vehicles; such organisms are also known as contaminating pests or stowaways (Toy and Newfield, 2010).
Impact (of a pest)	The impact of the pest on the crop output and quality and on the environment in the occupied spatial units.
Introduction (of a pest)	The entry of a pest resulting in its establishment (FAO, 2021).
Pathway	Any means that allows the entry or spread of a pest (FAO, 2021).
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, 2021).
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, 2021).
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, 2021).

Appendix A – *Nipaecoccus viridis* host plants/species affected

Source: CABI (online) and García Morales et al. (2016)

Host status	Host name	Plant family	Common name	References
Cultivated hosts	*Abelmoschus*	Malvaceae	–	García Morales et al. (2016)
	Abelmoschus esculentus	Malvaceae	Lady's fingers	García Morales et al. (2016)
	Abelmoschus manihot	Malvaceae	Hibiscus root	García Morales et al. (2016)
	Abrus	Fabaceae	–	García Morales et al. (2016)
	Abrus precatorius	Fabaceae	Rosary pea	CABI (online)
	Acacia	Fabaceae	–	García Morales et al. (2016)
	Acacia modesta	Fabaceae	–	CABI (online)
	Acacia nilotica	Fabaceae	Gum Arabic tree	CABI (online)
	Acalypha	Euphorbiaceae	Copperleaf	CABI (online)
	Acalypha indica	Euphorbiaceae	Indian copperleaf	García Morales et al. (2016)
	Acanthus ilicifolius	Acanthaceae	–	CABI (online)
	Albizia lebbeck	Fabaceae	Indian siris	CABI (online)
	Alcea rosea	Malvaceae	Hollyhock	CABI (online)
	Alhagi maurorum	Fabaceae	Camelthorn	CABI (online)
	Annona	Annonaceae	–	CABI (online)
	Annona muricata	Annonaceae	Soursop	CABI (online)
	Annona reticulata	Annonaceae	Bullock's heart	CABI (online)
	Annona squamosa	Annonaceae	Sugar apple	Fera, interception record, unpublished
	Antigonon leptopus	Polygonaceae	Bride's tears	García Morales et al. (2016)
	Apium graveolens	Apiaceae	Celery	García Morales et al. (2016)
	Arachis hypogaea	Fabaceae	Groundnut	CABI (online)
	Artocarpus altilis	Moraceae	–	García Morales et al. (2016)
	Artocarpus heterophyllus	Moraceae	Jackfruit	CABI (online)
	Artocarpus integer	Moraceae	Champedak	CABI (online)
	Asparagus	Liliaceae	–	CABI (online)
	Asparagus aethiopicus	Asparagaceae	Sprenger's asparagus	García Morales et al. (2016)
	Asparagus densiflorus	Asparagaceae	Asparagus fern	García Morales et al. (2016)
	Asparagus officinalis	Asparagaceae	Asparagus	CABI (online)
	Averrhoa carambola	Oxalidaceae	Carambola	CABI (online)
	Avicennia officinalis	Acanthaceae	–	García Morales et al. (2016)
	Beaumontia	Apocynaceae	–	García Morales et al. (2016)
	Beaumontia grandiflora	Apocynaceae	Easter lily vine	García Morales et al. (2016)
	Breynia	Phyllanthaceae	–	CABI (online)
	Breynia retusa	Phyllanthaceae	Cup–saucer plant	
	Cactus	Cactaceae	–	García Morales et al. (2016)
	Caesalpinia	Fabaceae	–	García Morales et al. (2016)
	Cajanus	Fabaceae	–	CABI (online)
	Cajanus cajan	Fabaceae	–	García Morales et al. (2016)
	Callistemon	Myrtaceae	–	García Morales et al. (2016)
	Camellia	Theaceae	–	García Morales et al. (2016)
	Camellia sinensis	Theaceae	Tea	CABI (online)
	Campsis grandiflora	Bignoniaceae	–	CABI (online)
	Carica papaya	Caricaceae	Papaya	García Morales et al. (2016)
	Cascaronia	Fabaceae	–	García Morales et al. (2016)

Host status	Host name	Plant family	Common name	References
	Casuarina	Casuarinaceae	Beefwood	CABI (online)
	Casuarina equisetifolia	Casuarinaceae	Casuarina	CABI (online)
	Catalpa	Bignoniaceae	–	García Morales et al. (2016)
	Ceratonia	Fabaceae	–	García Morales et al. (2016)
	Cestrum nocturnum	Solanaceae	Night jessamine	CABI (online)
	Chrysanthemum	Asteraceae	–	García Morales et al. (2016)
	Cicer arietinum	Fabaceae	Chickpea	CABI (online)
	Citrus	Rutaceae	–	CABI (online)
	Citrus aurantiifolia	Rutaceae	Lime	CABI (online)
	Citrus aurantium	Rutaceae	Sour orange	CABI (online)
	Citrus limon	Rutaceae	Lemon	CABI (online)
	Citrus limonia	Rutaceae	Mandarin lime	CABI (online)
	Citrus maxima	Rutaceae	Pummelo	CABI (online)
	Citrus medica	Rutaceae	Citron	CABI (online)
	Citrus reticulata	Rutaceae	Mandarin	CABI (online)
	Citrus sinensis	Rutaceae	Sweet orange	CABI (online)
	Citrus x paradisi	Rutaceae	Grapefruit	CABI (online)
	Clausena lansium	Rutaceae	Wampee	García Morales et al. (2016)
	Clerodendrum	Lamiaceae	–	García Morales et al. (2016)
	Clerodendrum infortunatum	Lamiaceae	–	CABI (online)
	Clerodendrum villosum	Lamiaceae	–	García Morales et al. (2016)
	Cocos nucifera	Arecaceae	Coconut	CABI (online)
	Coffea	Rubiaceae	Coffee	CABI (online)
	Coffea arabica	Rubiaceae	Arabica coffee	CABI (online)
	Coffea liberica	Rubiaceae	Liberian coffee tree	CABI (online)
	Corchorus	Malvaceae	–	García Morales et al. (2016)
	Corchorus capsularis	Tiliaceae	White jute	CABI (online)
	Cucumis	Cucurbitaceae	–	García Morales et al. (2016)
	Cucumis sativus	Cucurbitaceae	Cucumber	García Morales et al. (2016)
	Cydonia oblonga	Rosaceae	Quince	García Morales et al. (2016)
	Dalbergia	Fabaceae	–	García Morales et al. (2016)
	Dalbergia sissoo	Fabaceae	Indian rosewood	García Morales et al. (2016)
	Datura stramonium	Solanaceae	Jimsonweed	CABI (online)
	Desmodium	Fabaceae	Tick clovers	CABI (online)
	Dianthus caryophyllus	Caryophyllaceae	Carnation	García Morales et al. (2016)
	Dimocarpus longan	Sapindaceae	Longan	García Morales et al. (2016)
	Diospyros	Ebenaceae	–	García Morales et al. (2016)
	Diospyros lotus	Ebenaceae	Caucasian persimmon	García Morales et al. (2016)
	Eriobotrya japonica	Rosaceae	Loquat	CABI (online)
	Erythrina variegata	Fabaceae	Indian coral tree	CABI (online)
	Eugenia	Myrtaceae	–	García Morales et al. (2016)
	Euphorbia	Euphorbiaceae	–	García Morales et al. (2016)
	Euphorbia helioscopia	Euphorbiaceae	Sun spurge	García Morales et al. (2016)
	Euphorbia hirta	Euphorbiaceae	Garden spurge	CABI (online)
	Euphorbia prostrata	Euphorbiaceae	Blueweed	García Morales et al. (2016)
	Falcataria falcata	Fabaceae	Batai wood	García Morales et al. (2016)
	Ficus	Moraceae	–	CABI (online)

Host status	Host name	Plant family	Common name	References
	Ficus benghalensis	Moraceae	Banyan	CABI (online)
	Ficus carica	Moraceae	Common fig	CABI (online)
	Ficus sycomorus	Moraceae	Mulberry fig	García Morales et al. (2016)
	Flacourtia	Salicaceae	–	García Morales et al. (2016)
	Flacourtia indica	Salicaceae	Batoko plum	García Morales et al. (2016)
	Flacourtia inermis	Salicaceae	Lovi–lovi	CABI (online)
	Fritillaria	Liliaceae		
	Gardenia jasminoides	Rubiaceae	Cape jasmine	CABI (online)
	Geranium	Geraniaceae	–	García Morales et al. (2016)
	Glochidion rubrum	Euphorbiaceae	–	CABI (online)
	Glycine max	Fabaceae	Soyabean	CABI (online)
	Glycosmis	Rutaceae	–	García Morales et al. (2016)
	Glycosmis pentaphylla	Rutaceae	Gin berry	García Morales et al. (2016)
	Gossypium	Malvaceae	Cotton	CABI (online)
	Gossypium herbaceum	Malvaceae	Short staple cotton	CABI (online)
	Gossypium hirsutum	Malvaceae	Bourbon cotton	CABI (online)
	Grevillea robusta	Proteaceae	Silky oak	CABI (online)
	Helianthus	Asteraceae	–	
	Helianthus annuus	Asteraceae	Sunflower	García Morales et al. (2016)
	Hibiscus	Malvaceae	Rosemallows	CABI (online)
	Hibiscus manihot	Malvaceae	Bele	CABI (online)
	Hibiscus syriacus	Malvaceae	Althaea	García Morales et al. (2016)
	Holarrhena	Apocynaceae	–	García Morales et al. (2016)
	Houttuynia	Saururaceae	–	Fera, interception record, unpublished
	Hygrophila	Acanthaceae	–	García Morales et al. (2016)
	Hygrophila auriculata	Acanthaceae	–	García Morales et al. (2016)
	Hygrophila erecta	Acanthaceae	–	García Morales et al. (2016)
	Hygrophila spinosa			CABI (online)
	Impatiens walleriana	Balsaminaceae	Busy-lizzy	García Morales et al. (2016)
	Intsia bijuga	Fabaceae	Bajam teak	García Morales et al. (2016)
	Ipomoea	Convolvulaceae	–	García Morales et al. (2016)
	Ixora	Rubiaceae	–	CABI (online)
	Jacaranda mimosifolia	Bignoniaceae	Jacaranda	CABI (online)
	Jatropha curcas	Euphorbiaceae	Jatropha	CABI (online)
	Jatropha gossypifolia	Euphorbiaceae	–	García Morales et al. (2016)
	Jatropha integerrima	Euphorbiaceae	–	García Morales et al. (2016)
	Lagenaria siceraria	Cucurbitaceae	Bottle gourd	García Morales et al. (2016)
	Lagerstroemia indica	Lythraceae	Cannonball	García Morales et al. (2016)
	Lantana camara	Verbenaceae	Cherry pie	García Morales et al. (2016)
	Leucaena	Fabaceae		CABI (online)
	Leucaena leucocephala	Fabaceae	Leucaena	CABI (online)
	Leucas aspera	–	–	CABI (online)
	Ligustrum	Oleaceae	–	García Morales et al. (2016)
	Limonia	Rutaceae	–	García Morales et al. (2016)
	Limonia acidissima	Rutaceae	Elephant apple	García Morales et al. (2016)
	Luffa	Cucurbitaceae	–	García Morales et al. (2016)
	Luffa aegyptiaca	Cucurbitaceae	Loofah	CABI (online)
	Malus domestica	Rosaceae	Apple	García Morales et al. (2016)

Host status	Host name	Plant family	Common name	References
	Mangifera indica	Anacardiaceae	Mango	CABI (online)
	Manihot esculenta	Euphorbiaceae	Cassava	García Morales et al. (2016)
	Melochia	Malvaceae	–	García Morales et al. (2016)
	Mimosa pudica	Fabaceae	Action plant	García Morales et al. (2016)
	Morus	Moraceae	–	CABI (online)
	Morus alba	Moraceae	Mora	CABI (online)
	Morus nigra	Moraceae	Black mulberry	CABI (online)
	Mucuna	Fabaceae	–	García Morales et al. (2016)
	Murraya koenigii	Rutaceae	Curry leaf	García Morales et al. (2016)
	Musa	Musaceae	–	García Morales et al. (2016)
	Myrtus communis	Myrtaceae	Common myrtle	García Morales et al. (2016)
	Nephelium lappaceum	Sapindaceae	Rambutan	García Morales et al. (2016)
	Nerium indicum	Apocynaceae	Sweet oleander	García Morales et al. (2016)
	Nerium oleander	Apocynaceae	Oleander	CABI (online)
	Nyctanthes arbor-tristis	Verbenaceae	Tree of sadness	CABI (online)
	Ocimum tenuiflorum	Lamiaceae	Holy basil	CABI (online)
	Odontadenia	Apocynaceae	–	CABI (online)
	Olea europaea	Oleaceae	Common olive	García Morales et al. (2016)
	Opuntia	Cactaceae	–	García Morales et al. (2016)
	Parthenium hysterophorus	Asteraceae	Parthenium weed	CABI (online)
	Pelargonium	Geraniaceae	–	García Morales et al. (2016)
	Peristrophe bicalyculata	Acanthaceae	–	CABI (online)
	Persea americana	Lauraceae	Avocado	CABI (online)
	Phoenix dactylifera	Arecaceae	Common date palm	García Morales et al. (2016)
	Phyllanthus emblica	Euphorbiaceae	Indian gooseberry	CABI (online)
	Phyllanthus niruri	Euphorbiaceae	Seed-under-the-leaf	CABI (online)
	Pilea microphylla	Urticaceae	–	CABI (online)
	Pilea serpyllacea	Urticaceae	–	García Morales et al. (2016)
	Pinus	Pinaceae	Pines	CABI (online)
	Pithecellobium	Fabaceae	–	García Morales et al. (2016)
	Phyllanthus	Phyllanthaceae	–	García Morales et al. (2016)
	Phyllanthus amarus	Phyllanthaceae	Black catnip	García Morales et al. (2016)
	Phyllanthus emblica	Phyllanthaceae	Emblic	García Morales et al. (2016)
	Plumeria rubra	Apocynaceae	Red frangipani	CABI (online)
	Portulaca grandiflora	Portulacaceae	Rose moss	CABI (online)
	Prosopis cineraria	Fabaceae	Khejri tree	García Morales et al. (2016)
	Prosopis farcta	Fabaceae	Syrian mesquite	García Morales et al. (2016)
	Prunus armeniaca	Rosaceae	Apricot	García Morales et al. (2016)
	Psidium	Myrtaceae	–	García Morales et al. (2016)
	Psidium guajava	Lithomyrtus	Guava	CABI (online)
	Psophocarpus tetragonolobus	Fabaceae	Asparagus pea	García Morales et al. (2016)
	Pterospermum acerifolium	Malvaceae	Dinner plate tree	CABI (online)
	Punica granatum	Punicaceae	Pomegranate	CABI (online)
	Pyrus communis	Rosaceae	Common pear	García Morales et al. (2016)
	Ricinus communis	Euphorbiaceae	Castor-oil plant	García Morales et al. (2016)

Host status	Host name	Plant family	Common name	References
	Robinia pseudoacacia	Fabaceae	Black locust	Ülgentürk et al. (2022)
	Rosa	Rosaceae	–	García Morales et al. (2016)
	Rosa canina	Rosaceae	Briar rose	García Morales et al. (2016)
	Salvia splendens	Lamiaceae	Scarlet sage	García Morales et al. (2016)
	Sanchezia nobilis	Acanthaceae	–	CABI (online)
	Schefflera	Araliaceae	–	García Morales et al. (2016)
	Schleinitzia fosbergii	Fabaceae	–	García Morales et al. (2016)
	Serianthes nelsonii	Fabaceae	–	García Morales et al. (2016)
	Sesbania sesban	Fabaceae	Egyptian rattlepod	García Morales et al. (2016)
	Sida	Malvaceae	–	CABI (online)
	Solanum	Solanaceae	–	García Morales et al. (2016)
	Solanum lycopersicum	Solanaceae	Tomato	CABI (online)
	Solanum melongena	Solanaceae	Eggplant	García Morales et al. (2016)
	Solanum tuberosum	Solanaceae	Potato	CABI (online)
	Sonchus	Asteraceae	–	García Morales et al. (2016)
	Spathodea campanulata	Bignoniaceae	African tulip tree	CABI (online)
	Streblus asper	Moraceae	Sandpaper tree	CABI (online)
	Suregada	Euphorbiaceae	–	García Morales et al. (2016)
	Suregada multiflora	Euphorbiaceae	–	García Morales et al. (2016)
	Tabebuia rosea	Bignoniaceae	Rosy trumpet tree	García Morales et al. (2016)
	Tagetes erecta	Asteraceae	African marigold	García Morales et al. (2016)
	Tamarindus	Fabaceae		CABI (online)
	Tamarindus indica	Fabaceae	Tamarind	CABI (online)
	Tamarix	Tamaricaceae	Tamarisk	CABI (online)
	Tephrosia	Fabaceae	Hoary-pea	CABI (online)
	Thespesia	Malvaceae	–	García Morales et al. (2016)
	Thespesia populnea	Malvaceae	Portia tree	CABI (online)
	Tinospora cordifolia	Menispermaceae	–	
	Trachelospermum	Apocynaceae	–	García Morales et al. (2016)
	Trachelospermum lucidum	Apocynaceae	–	García Morales et al. (2016)
	Vachellia nilotica	Fabaceae	Egyptian mimosa	García Morales et al. (2016)
	Verbena	Verbenaceae	–	García Morales et al. (2016)
	Vigna radiata	Fabaceae	Mung bean	CABI (online)
	Vitex negundo	Lamiaceae		CABI (online)
	Vitis	Vitaceae	–	García Morales et al. (2016)
	Vitis vinifera	Vitaceae	Grapevine	CABI (online)
	Ziziphus	Rhamnaceae		CABI (online)
	Ziziphus jujuba	Rhamnaceae	Common jujube	CABI (online)
	Ziziphus mauritiana	Rhamnaceae	Jujube	CABI (online)
	Ziziphus spina-christi	Rhamnaceae	Christ's thorn jujube	CABI (online)
	Zygophyllum fabago	Zygophyllaceae	Bean caper	García Morales et al. (2016)
Wild weed hosts	*Acacia karroo*	Fabaceae	Sweet thorn	CABI (online)
	Clerodendrum villosum	Lamiaceae	–	CABI (online)
	Cuscuta exaltata	Convolvulaceae	Dodder	CABI (online)
	Cynodon dactylon	Poaceae	Bahama grass	García Morales et al. (2016)
	Solanum nigrum	Solanaceae	Black nightshade	García Morales et al. (2016)

Appendix B – Distribution of *Nipaecoccus viridis*

Distribution records based on EPPO Global Database (EPPO, online), García Morales et al. (2016) and CABI (online).

Region	Country	Sub-national (e.g. State)	Status	
North America	Bahamas		Present, no details	EPPO (online)
	Mexico		Present, no details	EPPO (online)
	United States of America		Present, restricted distribution	EPPO (online)
	United States of America	Florida	Present, no details	EPPO (online)
	United States of America	Hawaii	Present, no details	EPPO (online)
	United States of America	Guam	Present, no details	García Morales et al. (2016)
Africa	Algeria		Present, no details	EPPO (online)
	Angola		Present, no details	EPPO (online)
	Benin		Present, no details	EPPO (online)
	Burkina Faso		Present, no details	EPPO (online)
	Comoros		Present, no details	EPPO (online)
	Cote d'Ivoire		Present, no details	EPPO (online)
	Egypt		Present, no details	EPPO (online)
	Eritrea		Present, no details	EPPO (online)
	Kenya		Present, no details	EPPO (online)
	Madagascar		Present, no details	EPPO (online)
	Malawi		Present, no details	EPPO (online)
	Mali		Present, no details	EPPO (online)
	Mauritius		Present, no details	EPPO (online)
	Niger		Present, no details	EPPO (online)
	Nigeria		Present, no details	EPPO (online)
	Reunion		Present, no details	EPPO (online)
	Rwanda		Present, no details	EPPO (online)
	Senegal		Present, no details	EPPO (online)
	Seychelles		Present, no details	EPPO (online)
	South Africa		Present, no details	EPPO (online)
	Sudan		Present, no details	EPPO (online)
	Tanzania		Present, no details	EPPO (online)
	Togo		Present, no details	EPPO (online)
	Uganda		Present, no details	EPPO (online)
	Zambia		Present, no details	CABI (online)
	Zimbabwe		Present, no details	EPPO (online)
Asia	Afghanistan		Present, no details	EPPO (online)
	Bangladesh		Present, no details	EPPO (online)
	Bhutan		Present, no details	García Morales et al. (2016)
	Burma (=Myanmar)		Present, no details	García Morales et al. (2016)
	Cambodia		Present, no details	EPPO (online)
	China		Present, no details	EPPO (online)
	China	Hainan	Present, no details	García Morales et al. (2016)
	China	Henan (=Honan)	Present, no details	García Morales et al. (2016)
	China	Hunan	Present, no details	EPPO (online)
	China	Xianggang (Hong Kong)	Present, no details	EPPO (online)

Region	Country	Sub-national (e.g. State)	Status	
	China	Nei Monggol (=Inner Mongolia)	Present, no details	García Morales et al. (2016)
	India		Present, no details	EPPO (online)
	India	Assam	Present, no details	García Morales et al. (2016)
	India	Andhra Pradesh	Present, no details	EPPO (online)
	India	Bihar	Present, no details	EPPO (online)
	India	Delhi	Present, no details	EPPO (online)
	India	Goa	Present, no details	EPPO (online)
	India	Gujarat	Present, no details	EPPO (online)
	India	Himachal Pradesh	Present, no details	EPPO (online)
	India	Karnataka	Present, no details	EPPO (online)
	India	Kerala	Present, no details	EPPO (online)
	India	Lakshadweep	Present, no details	CABI (online)
	India	Madhya Pradesh	Present, no details	EPPO (online)
	India	Maharashtra	Present, no details	EPPO (online)
	India	Odisha	Present, no details	EPPO (online)
	India	Punjab	Present, no details	EPPO (online)
	India	Rajasthan	Present, no details	García Morales et al. (2016)
	India	Tamil Nadu	Present, no details	EPPO (online)
	India	Tripura	Present, no details	García Morales et al. (2016)
	India	Uttar Pradesh	Present, no details	EPPO (online)
	India	West Bengal	Present, no details	EPPO (online)
	Indonesia		Present, no details	EPPO (online)
	Indonesia	Java	Present, no details	EPPO (online)
	Indonesia	Irian Jaya	Present, no details	García Morales et al. (2016)
	Indonesia	Sulawesi (=Celebes)	Present, no details	García Morales et al. (2016)
	Iran		Present, no details	EPPO (online)
	Iraq		Present, no details	EPPO (online)
	Israel		Present, no details	EPPO (online)
	Japan		Present, no details	EPPO (online)
	Japan	Ryukyu Archipelago	Present, no details	EPPO (online)
	Jordan		Present, no details	EPPO (online)
	Laos		Present, no details	García Morales et al. (2016)
	Malaysia		Present, no details	EPPO (online)
	Nepal		Present, no details	EPPO (online)
	Oman		Present, no details	EPPO (online)
	Pakistan		Present, no details	EPPO (online)
	Philippines		Present, no details	EPPO (online)
	Saudi Arabia		Present, no details	EPPO (online)
	Singapore		Present, no details	García Morales et al. (2016)
	Sri Lanka		Present, no details	EPPO (online)
	Syria		Present, no details	García Morales et al. (2016)
	Taiwan		Present, no details	EPPO (online)
	Thailand		Present, no details	EPPO (online)
	Vietnam		Present, no details	EPPO (online)
Europe	Turkey		Present, restricted distribution	EPPO (online)
Oceania	Australia		Present, no details	EPPO (online)
	Australia	Northern Territory	Present, no details	EPPO (online)

Region	Country	Sub-national (e.g. State)	Status	
	Australia	Queensland	Present, no details	EPPO (online)
	Australia	Christmas island	Present, no details	García Morales et al. (2016)
	Guam		Present, no details	EPPO (online)
	Kiribati		Present, no details	EPPO (online)
	New Caledonia		Present, widespread	EPPO (online)
	Northern Mariana Islands		Present, no details	EPPO (online)
	Papua New Guinea		Present, no details	EPPO (online)
	Solomon Islands		Present, no details	EPPO (online)
	Tuvalu		Present, no details	EPPO (online)
	United States of America	Guam	Present, no details	García Morales et al. (2016)

Appendix C – Import data

Table C.1: **Fresh or chilled celery (excl. celeriac) (CN code: 0709 40 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
Mexico	:	:	0.02	0.04	:
Laos	41.09	49.31	6.22	29.41	29.01
Egypt	:	:	2.15	100.00	362.88
Kenya	0.43	:	:	:	:
Uganda	0.03	:	:	:	:
Togo	5.00	:	:	:	:
Cambodia	:	:	:	0.10	:
Jordan	:	:	:	2.31	:
Israel	13.53	384.31	210.98	285.19	10.08
Iran	:	3.00	:	:	:
Indonesia	:	:	0.02	:	:
Malaysia	:	0.21	:	2.11	2.62
Sri Lanka	0.02	2.52	0.19	:	:
Thailand	122.09	129.77	110.24	86.17	62.54
Pakistan	:	:	:	0.02	:
Viet Nam	0.64	2.34	6.19	:	0.01
Total	182.83	571.46	336.01	505.35	467.14

Table C.2: **Fresh tamarinds, cashew apples, lychees, jackfruit, sapodillo plums, passion fruit, carambola and pitahaya (CN code: 0810 90 20)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States	3.97	3.00	0.07	:	0.02
Mexico	543.90	212.78	1295.08	669.87	2331.91
Angola	0.20	:	98.60	205.72	435.93
Laos	1269.84	847.10	542.10	469.73	238.57
China	314.75	287.38	1112.11	1014.77	823.41
Benin	:			0.80	
Burkina Faso	:	5.40	:	5.23	3.50
Côte d'Ivoire	:	1.29	19.76	7.90	10.19
Egypt	:	13.79	:	:	39.05
Kenya	714.44	221.45	603.11	481.00	697.14
Madagascar	173510.13	155018.24	164639.51	164524.38	135809.60
Mauritius	2707.68	787.16	2685.52	1167.15	1145.97
Mali	:	:	24.40	6.44	25.28
Nigeria	:	:	:	1.91	3.09
South Africa	39656.26	45282.45	30643.15	27215.68	19903.15
Zambia		631.60	4568.50	3526.04	3087.69
Rwanda	0.18	4.77	0.22	11.75	17.28
Uganda	500.68	682.07	698.61	666.57	571.89
Senegal	174.50	9.14	15.30		
Togo	7.44	2.66	3.86	6.36	12.44
Tanzania	0.35		1.27	8.77	4.52

Country	2016	2017	2018	2019	2020
Zimbabwe	3880.59	3622.61	3725.92	4324.34	4886.79
Bangladesh	140.15	222.55	291.61	206.12	382.00
Myanmar	:	:	:	:	9.96
Cambodia	84.38	546.37	806.76	1101.17	712.82
Japan			0.07	0.02	
India	324.19	621.75	1095.12	1168.69	754.33
Israel	2943.37	2919.30	1061.09	1125.92	594.86
Iran	6.25	:	1.75	0.50	3.88
Indonesia	103.20	333.37	297.72	246.67	441.64
Malaysia	15348.23	14205.33	13879.92	14235.96	7849.58
Saudi Arabia					
Sri Lanka	347.84	392.81	104.84	104.62	85.24
Australia	:	:	:	:	12.50
Singapore	9.00	:	8.48	:	:
Philippines	9.78	14.26	:	0.88	:
Thailand	9774.93	10279.68	12461.38	14900.21	10138.75
Taiwan	11.92	:	10.59	25.97	8.97
Pakistan	2.22	3.34	8.17	:	:
Syria	0.17	2.00	:	:	:
Viet Nam	33078.82	38428.61	44070.83	52846.33	45652.67
Total	285469.36	275602.26	284775.42	290277.47	236694.62

Table C.3: **Fresh tamarinds, cashew apples, lychees, jackfruit, sapodillo plums, passion fruit, carambola and pitahaya (CN code: 0810 90 20)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States	396.10	487.57	757.90	290.34	242.32
Mexico	37911.10	40833.08	39774.49	44987.19	37198.92
Laos	0.02	:	:	:	0.48
China	:	0.04	:	11.28	1575.35
Côte d'Ivoire	:	:	12.68	:	:
Egypt	0.06	:	2.96	7.32	:
Eritrea	:	:	:	:	:
Kenya	34.21	19.98	12.03	71.08	17.85
Madagascar	0.13	1.20	75.57	330.52	62.13
Cambodia	:	:	:	0.06	0.01
Japan	0.02	0.11	0.07	:	:
India	:	:	0.01	:	:
Israel	:	:	0.17	0.15	
Malaysia	:	:	:	0.94	2.13
Sri Lanka	:	:	:	0.10	:
Australia	10.00	:	:	:	:
Singapore	:	:	:	:	0.02
Thailand	1855.02	1584.69	1407.76	1519.97	874.24
Taiwan	:	:	:	2.24	:
Syria	:	:	19.52	:	:
Viet Nam	0.01	:	:	:	0.04
Total	40276.59	42946.74	42063.76	47221.40	40109.92

Table C.4: **Fresh or chilled asparagus (CN code: 0709 20 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States	396.10	487.57	757.90	290.34	242.32
Mexico	37911.10	40833.08	39774.49	44987.19	37198.92
Laos	0.02	:	:	:	0.48
China	:	0.04	:	11.28	1575.35
Côte d'Ivoire	:	:	12.68	:	
Egypt	0.06	:	2.96	7.32	:
Kenya	34.21	19.98	12.03	71.08	17.85
Madagascar	0.13	1.20	75.57	330.52	62.13
South Africa	69.92	20.06	0.60	0.21	136.43
Cambodia	:	:	:	0.06	0.01
Japan	0.02	0.11	0.07	:	:
India	:	:	0.01	:	:
Israel	:	0.01	0.17	0.15	:
Malaysia	:	:	:	0.94	2.13
Sri Lanka	:	:	:	0.10	:
Australia	10.00	:	:	:	:
Singapore	:	:	:	:	0.02
Thailand	1855.02	1584.69	1407.76	1519.97	874.24
Taiwan	:	:	:	2.24	:
Syria	:	:	19.52	:	:
Viet Nam	0.01	:	:	:	0.04
Total	40276.59	42946.74	42063.76	47221.40	40109.92

Table C.5: **Fresh pawpaws "papayas" (CN code: 0807 20 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States	200.21	84.83	118.34	19.80	42.16
Mexico	456.27	2793.18	2613.06	2918.40	2191.29
Angola			302.53	777.89	2795.00
Laos	449.13	296.22	364.27	527.13	469.50
China	:	:	:	3.00	:
Benin	:	5.15	0.80	1.39	0.98
Burkina Faso	:	9.60	14.11	7.60	:
Côte d'Ivoire	540.78	23.03	5.17	:	6.22
Egypt		:	48.00	:	:
Kenya	0.48	:	:	1.50	48.35
Madagascar		:	8.82	10.64	:
Mauritius	16.63	:	:	:	:
Nigeria	0.18	:	:	:	:
South Africa	2.20	123.55	377.24	478.96	14.08
Uganda	9.53	56.11	17.22	25.61	23.97
Senegal	24.73	0.94	:	:	:
Togo	269.51	125.33	121.15	114.23	104.81
Tanzania		0.78	0.56	:	:
Bangladesh	379.81	147.75	138.57	62.33	21.95
Cambodia	397.26	514.79	513.79	338.37	375.98

Country	2016	2017	2018	2019	2020
India	266.16	336.28	378.24	564.48	130.39
Israel	666.65	661.56	714.92	276.69	224.50
Indonesia	0.08	0.18	0.04	62.58	42.72
Malaysia	53.69	114.20	12.85	38.99	0.27
Sri Lanka	841.21	656.39	449.05	540.82	92.27
Philippines	:	3.96	1.21	1.26	:
Thailand	6494.24	7334.28	7831.20	7562.99	4561.88
Taiwan	:	0.00	:	1.99	:
Pakistan	:	5.60	19.01	5.37	:
Viet Nam	726.15	200.97	381.47	413.60	327.07
New Caledonia	:	:	:	1.00	:
Total	11794.90	13494.68	14431.62	14756.62	11473.39

Table C.6: **Fresh or dried lemons (*Citrus limon, Citrus limonum*) and limes (*Citrus aurantifolia, Citrus latifolia*) (CN code: 0805 50)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States	2235.14	237.15	421.30	428.24	5872.01
Mexico	414964.64	419216.51	506848.43	350914.58	285487.23
Angola	0.00	0.00	42.53	0.00	0.00
Laos	50.81	0.00	0.00	0.00	11.53
China	260.72	2.10	1.02	44.48	6397.15
Burkina Faso	59.15	139.20	103.95	34.25	51.92
Côte d'Ivoire	0.00	0.00	246.40	0.00	0.00
Egypt	14242.68	30762.76	28809.28	22439.74	45339.11
Kenya	0.00	0.00	0.00	0.00	34.56
Madagascar	0.10	0.00	5.60	0.04	13.98
Mauritius	0.00	0.00	14.00	0.00	7.35
South Africa	443077.77	561932.38	819786.01	944806.26	1448946.40
Uganda	1.38	2.14	4.42	7.35	9.77
Senegal	0.00	0.20	0.00	0.00	0.00
Togo	0.00	0.00	6.24	0.42	0.00
Sudan	0.00	0.00	2.10	0.00	20.08
Tanzania	0.00	0.00	0.20	0.00	0.00
Zimbabwe	0.00	0.00	0.00	243.69	1019.19
Bangladesh	200.74	42.32	73.75	249.07	759.70
Afghanistan	0.01	0.00	0.00	2.00	0.00
Cambodia	0.00	0.01	0.00	0.00	0.25
Japan	161.04	256.25	114.53	215.60	67.19
Jordan	1.16	0.00	3.79	1.40	11.81
Iraq	0.00	3.60	6.30	0.00	20.00
India	79.92	1.00	33.75	17.16	0.50
Israel	17010.88	2675.62	15817.68	1982.47	416.24
Iran	943.28	667.21	863.69	822.42	1173.30
Indonesia	166.21	82.06	315.30	248.39	142.13
Malaysia	4.18	5.54	2.46	0.81	0.00
Sri Lanka	0.00	80.95	95.62	0.20	12.80
Australia	243.68	100.78	332.74	547.62	5.75

Country	2016	2017	2018	2019	2020
Philippines	0.00	0.00	0.20	2.29	0.00
Thailand	13.85	23.19	72.00	14.00	15.10
Pakistan	0.00	0.00	2.25	0.59	0.00
Syria	0.81	31.06	0.00	4.30	6.47
Viet Nam	25237.78	40793.00	56385.62	56364.39	52401.63
Total	918955.93	1057055.03	1430411.19	1379391.76	1848243.15

Table C.7: **Fresh or dried grapefruit (CN code: 0805 40 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States	259620.77	194063.68	130312.27	134522.83	101349.91
Mexico	132997.10	128233.11	77846.41	89037.20	55247.60
China	827310.17	1084839.19	1023348.37	1108528.93	1092246.65
Côte d'Ivoire	224.00				
Egypt	2701.17	1580.15	3261.41	4411.51	3048.70
South Africa	818033.13	851594.34	978681.31	921280.18	854916.87
Uganda	:	:	:	:	2.11
Sudan	:	:	:	:	0.50
Tanzania	9.90	:	3.40	9.78	:
Zimbabwe	19385.06	16919.26	25612.29	15209.77	16496.04
Bangladesh	:	171.60	:	:	:
India	5.00	:	:	7.89	
Israel	257904.61	208679.65	218945.84	141834.58	230981.55
Iran	:	:	56.60	:	19.45
Indonesia	:	:	0.03	:	:
Malaysia	:	:	7.82	:	:
Thailand	376.42	1224.53	484.17	548.33	149.62
Syria	:	281.66	:	:	6.70
Viet Nam	3411.58	5931.71	14490.01	17583.82	11307.23
Total	2321978.91	2493518.88	2473049.93	2432974.82	2365772.93

Table C.8: **Coconuts, Brazil nuts and cashew nuts, fresh or dried, whether or not shelled or peeled (CN code: 0801)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States	2447.78	1994.95	1377.75	511.55	845.48
Mexico	15.38	0.48	0.05	0.25	0.10
Laos	:	0.09	280.00	0.23	:
China	1409.93	1078.20	995.67	1091.95	3073.07
Benin	3230.85	2034.22	2584.36	8774.77	11418.80
Burkina Faso	6815.50	9277.88	9671.97	16559.92	20808.27
Côte d'Ivoire	211230.31	214918.07	250187.34	222932.19	214728.15
Egypt	4.20	3.23	2.77	14.96	0.84
Kenya	17.01	696.35	57.73	244.49	1191.89
Madagascar	615.99	624.94	783.06	426.35	524.37
Mauritius	:	:	8.15	1.76	0.02
Mali	:	232.21	97.80	1.00	132.01
Nigeria	420.98	907.20	1694.57	3833.89	5440.62

Country	2016	2017	2018	2019	2020
South Africa	1.24	103.64	0.50	0.79	205.46
Seychelles	:	:	0.15		
Uganda	:	2.07	2.99	3.61	1.90
Senegal	274.73	66.94	365.97	389.60	233.72
Togo	1793.96	1514.05	2688.34	5714.47	6346.80
Tanzania	1889.75	2570.78	1197.66	1931.29	1800.05
Bangladesh	56.95	:	:	:	:
Afghanistan	0.03	:	:	:	0.07
Myanmar (Burma)	:	:	0.15	:	10.00
Cambodia	:	0.61	:	0.95	3.77
Japan	:	:	:	:	:
Jordan	0.01	1.13	3.00	4.14	0.03
Iraq	:	0.02	:	10.11	23.16
India	170399.32	243346.77	192497.06	205693.06	172138.65
Israel	2.40	12.32	4.95	2.36	11.16
Iran	5.10	1.86	2.53	8.34	11.03
Indonesia	255797.58	287011.09	302686.51	259644.02	238720.48
Malaysia	5507.22	8394.49	4041.78	2329.06	4411.77
Saudi Arabia	0.24	0.04	:	0.28	0.34
Sri Lanka	129125.94	70924.94	57516.21	76430.03	60597.36
Australia	326.68	161.34	3.97	3.09	0.02
Singapore	5898.34	2475.13	3211.06	7262.20	3843.87
Philippines	368573.57	419893.07	419609.28	398109.92	395721.76
Thailand	79261.58	78956.34	68012.09	59013.35	35161.23
Taiwan	14.36	:	3.40	:	0.01
Oman	:		0.02	:	0.01
Pakistan	63.15	11.50	22.53	24.60	25.70
Syria	0.60	2.23	12.37	17.80	1.25
Viet Nam	761279.37	798319.82	818389.73	967893.87	1177974.48
New Caledonia				1.62	
Total	2006480.05	2145538.00	2138013.47	2238881.87	2355407.70

Table C.9: **Cucumbers and gherkins, fresh or chilled (CN code: 0707 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States		9.91	:	1.00	0.56
Mexico	6.93		:	:	27.04
Laos	:	0.13	:	:	:
China	:		:	0.70	:
Algeria	0.50	87.32	242.36	1.00	:
Egypt	916.97	1264.14	1313.85	897.54	826.95
Kenya	2.00	:	:	:	:
South Africa			0.01	0.55	:
Uganda	23.06	95.64	9.29	4.98	:
Senegal	8.00	:	2211.76	:	:
Sudan	:	:	:	15.00	10.00
Bangladesh	33.61	22.55	8.79	19.40	19.55
Japan	3.28	6.76	4.19	18.14	6.59

Country	2016	2017	2018	2019	2020
Jordan	7754.88	9154.90	8897.34	10292.92	5263.08
India	70.80	109.07	118.91	156.88	177.49
Israel	2242.67	1756.18	1806.98	794.48	21.04
Iran	188.86	1740.91	422.80	636.46	2187.78
Indonesia	:	0.01	0.02	:	:
Sri Lanka	0.32	1.46	8.03	5.34	6.95
Philippines				0.45	:
Thailand	5.25	2.89	2.04	0.93	0.03
Nepal	0.01	:	:	:	:
Pakistan	:	6.90	12.83	12.75	:
Syria	:	:	:	:	38.72
Viet Nam	0.25	0.87	:	:	:
Total	11257.39	14259.64	15059.2	12858.52	8585.78

Table C.10: **Fresh quinces (CN code: 0808 40 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States	:	37.80	1.52	:	:
China	:	:	:	:	178.68
South Africa	:	:	:	18.50	:
Japan	1.20	:	:	:	:
India	2.00	:	:	:	:
Israel	181.57	382.52	:	:	565.35
Iran	7.56	:	:	:	21.75
Total	192.33	420.32	1.52	18.5	765.78

Table C.11: **Fresh persimmons (CN code: 0810 70 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
China	17.57	:	5.09	:	17.40
South Africa	823.16	817.79	206.08	7857.42	4974.49
Afghanistan	:	:	:	:	22.95
Japan	:	0.27	0.76	0.27	0.02
Israel	2404.45	3231.29	1158.64	181.58	3211.13
Thailand	:	:	0.07	:	:
Pakistan	:	:	:	0.52	:
Viet Nam	:	:	:	:	0.01
Total	3245.18	4049.35	1370.64	8039.79	8226

Table C.12: **Fresh figs (CN code: 0804 20)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States	:	:	:	0.04	:
Mexico	79.83	189.76	153.89	118.92	94.08
Laos	:	3.26	:	:	:
Algeria	10.00	20.93	8.12	1.50	:

Country	2016	2017	2018	2019	2020
Egypt	7.46	10.53	13.41	44.08	60.26
Kenya		0.10			
South Africa	493.50	697.57	624.33	464.30	471.60
Zimbabwe	0.00	:	:	:	:
Jordan	4.69	:	3.72	5.53	4.68
Iraq	:	:	:	:	:
India	145.14	59.70	15.48	20.64	7.96
Israel	2316.88	1300.18	1406.99	859.53	604.66
Iran	:	:	0.07	:	4.95
Saudi Arabia	:	0.05	:	:	:
Sri Lanka	:	0.40	:	93.87	:
Viet Nam	:		:	:	0.02
Papua New Guinea	:	0.18	:	:	:
Total	3057.5	2282.66	2226.01	1608.41	1248.21

Table C.13: **Fresh apples (CN code 0808 10)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/4/2022)

Country	2016	2017	2018	2019	2020
United States	0.05	545.82	2874.22	:	:
China	13188.53	1644.89	15539.34	780.15	4778.37
Algeria	856.80	:	:	4.66	:
Egypt	3161.05	3234.13	2299.68	:	2501.73
Mauritius	:	:	:	1.32	:
Nigeria	:	0.76	:	:	:
South Africa	298162.64	252068.96	334615.90	258077.03	329086.35
Zambia	:	:	205.80	:	:
Uganda	:	:	0.15	:	:
Bangladesh	:	2.64	2.18	0.63	4.05
Japan	7.61	0.53	0.95	:	19.25
Jordan	572.72	:	:	206.52	:
India	0.01	:	:	:	0.45
Israel	2225.55	1037.58	936.63	1813.20	755.03
Iran	:	:	2945.28	0.38	676.65
Sri Lanka	:	:	:	0.15	:
Australia	1048.66	4926.09	9159.46	8311.03	3638.72
Singapore	211.68	:	:	:	:
Thailand	:	3.79	:	:	:
Taiwan	:	:	:	2.97	:
Pakistan	:	:	:	1.95	0.08
Syria	:	:	585.00	:	:
Viet Nam	:	:	0.20	:	:
Total	319435.30	263465.19	369164.79	269199.99	341460.68

Table C.14: **Fresh or dried guavas, mangoes and mangosteens (CN code 0804 50 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/04/2022

Country	2016	2017	2018	2019	2020
United States	78874.11	45478.21	54660.34	82580.54	82852.21
Mexico	35095.07	40848.36	46001.68	50935.79	51841.89
Angola	:	:	486.65	658.15	351.50
Laos	753.34	620.36	603.14	806.50	525.32
China	38.95	51.87	180.81	78.23	104.34
Benin		26.40	:	:	226.79
Burkina Faso	62078.35	45732.84	52399.48	65354.19	64404.44
Comoros	:	:	:	94.92	
Côte d'Ivoire	229117.62	268109.01	278429.74	281610.27	230154.91
Egypt	4135.64	9186.69	4855.57	6407.46	12233.16
Kenya	232.06	4.08	65.09	10.30	66.53
Madagascar	246.94	22.10	15.02	0.66	1.05
Mali	72965.87	53045.00	68743.59	91829.06	85458.70
Malawi	:	:	:	:	648.00
Nigeria	0.78	0.10	1.13	1.95	0.03
South Africa	8550.13	13015.45	9739.99	12116.95	8656.28
Zambia	:	2.46	:	:	23.04
Uganda	257.30	452.71	360.01	662.25	389.56
Senegal	97669.02	114177.24	147536.88	125252.79	88969.02
Togo	39.19	58.16	57.86	221.65	40.00
Sudan	34.71	43.30	215.93	29.99	10.00
Tanzania	:	:	0.50	1.14	:
Bangladesh	438.53	256.66	331.27	310.73	323.91
Myanmar (Burma)	:	0.28	1.47	1.00	:
Cambodia	883.47	2098.02	2164.17	1533.79	904.49
Japan	0.66	:	:	:	0.01
Jordan	4.00	:	:	:	:
India	5989.34	8148.87	9470.36	9315.51	7347.61
Israel	143726.08	140551.30	108353.48	121875.16	98143.59
Iran, Islamic Republic of	15.65	12.12	3.00	9.10	1.56
Indonesia	1981.20	2004.36	2926.64	2386.27	1406.94
Malaysia	289.86	197.22	170.64	72.72	44.56
Saudi Arabia	0.10	0.69	95.05	:	0.18
Sri Lanka	1254.27	1003.35	765.31	813.83	423.16
Australia	25.72	94.18	62.92	:	:
Singapore	1.20	:	:	0.23	0.15
Philippines	1028.05	519.88	795.56	368.97	128.10
Thailand	6460.81	7401.80	6911.89	6743.92	5260.84
Taiwan	:	:	3.48	17.34	0.92
Oman	:	:	:	223.93	
Pakistan	17149.78	15912.58	21867.43	29207.33	16196.50
Viet Nam	794.89	950.37	1346.64	1546.69	965.31
Guam	:	:	:	:	224.00
Total	770132.69	770026.02	819622.72	893079.31	758328.60

Table C.15: **Fresh or chilled olives (excl. for oil production) (CN code 0709 92)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/04/2022

Country	2016	2017	2018	2019	2020
Egypt	:	:	:	21.16	130.13
South Africa	:	:	:	0.09	:
Bangladesh	9.90	15.44	23.98	11.70	11.10
Jordan	63.51	3.50	9.06	57.58	:
Saudi Arabia	:	:	:	:	0.05
Total	73.41	18.94	33.04	90.53	141.28

Table C.16: **Fresh or dried avocados (excl. for oil production) (CN code 0804 40 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/04/2022

Country	2016	2017	2018	2019	2020
United States	8819.53	1.19	2546.86	0.02	4.66
Mexico	503687.52	445611.06	463741.28	767878.48	716092.02
Angola	:	:	3.85	:	3.54
China	193.97	35.28	:	1.23	0.04
Côte d'Ivoire	8.15	18.26	230.36	72.20	68.24
Egypt	211.20	5.35	4.58	79.92	363.95
Kenya	228426.16	243947.31	404593.87	346231.90	435308.72
Madagascar	:	:	:	:	0.96
Mauritius	124.44	36.13	42.27	24.28	15.23
Nigeria	1.06	3.15	3.18	0.51	:
South Africa	419768.89	315854.56	652817.98	401352.79	416290.22
Zambia	:	:	53.68	:	
Rwanda	2.75	125.33	225.09	216.44	153.67
Uganda	1912.57	2195.25	2233.81	3364.25	3575.68
Senegal					
Togo	11.76	7.87	12.89	1.42	57.15
Tanzania	26823.05	25773.58	55517.16	60480.96	50769.74
Zimbabwe	13030.06	20378.85	36539.24	32020.52	38872.63
India	0.04	2.06	0.52	0.06	:
Israel	301123.91	424267.97	370378.23	437318.01	345664.24
Malaysia	0.03	:	47.04	:	:
Saudi Arabia	:	0.05		0.06	
Sri Lanka	7.03	4.88	5.63	2.00	11.95
Australia	:	:	:	0.01	:
Philippines	:	:	:	:	0.05
Thailand	3.68	9.76	9.66	9.06	3.39
Viet Nam	1.00	:	:	0.05	:
New Caledonia	:	:	:	2.09	:
Total	1504156.80	1478277.89	1989007.18	2049056.26	2007256.08

Table C.17: **Fresh pears (CN code 0808 30)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/04/2022

Country	2016	2017	2018	2019	2020
United States	214.47	454.76	471.49	12.54	:
China	102076.61	98191.53	116993.12	82741.84	99293.92
Egypt	:	31.50	0.90	:	225.00
Nigeria	:	:	1.00	:	0.36
South Africa	865862.63	759193.32	655428.91	590939.08	583331.56
Afghanistan	:	:	:	225.00	:
Japan	2.50	0.02	0.45	:	:
Israel	:	664.59	:	569.20	219.49
Iran	:	:	32.40	:	7.50
Australia	:	:	1224.72	:	:
Total	968156.21	858535.72	774152.99	674487.66	683077.83

Table C.18: **Tomatoes, fresh or chilled (CN code 0702 00 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/04/2022

Country	2016	2017	2018	2019	2020
United States	:	:	0.11	0.04	0.13
Mexico	:	:	:	:	0.80
Angola	:	0.18	:	:	:
Algeria	30.45	27.56	161.85	461.62	:
Côte d'Ivoire	:	:	0.10	:	:
Egypt	9135.43	14023.94	15102.55	18876.68	9491.42
Madagascar	7.31	:	40.00	:	:
Uganda		0.12	:	:	:
Senegal	91850.25	62281.26	85804.22	77820.16	74513.76
Japan	13.75	8.98	13.31	45.67	34.37
Jordan	364.60	:	208.35	21.60	151.41
India	:	:	:	0.01	
Israel	16739.21	10861.22	6392.59	782.65	138.00
Iran	:	363.79	:	:	11.13
Australia	:	:	:	2.52	:
Thailand	0.08	0.08	0.08	0.02	0.02
Oman	:	:	:	:	1.27
Viet Nam	0.03	0.06	:	:	
Total	118141.1	87567.19	107723.2	98010.97	84342.31

Table C.19: **Fresh or chilled aubergines "eggplants" (CN code 0709 30 00)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/04/2022

Country	2016	2017	2018	2019	2020
United States	:	18.21	:	28.58	:
Mexico	24.15	2350.17	7799.81	8442.93	6853.17
Laos	623.61	507.16	553.87	651.54	575.33
China	:	:	:	0.60	:
Algeria	:	5.61	116.97	44.96	:
Burkina Faso	2202.53	3908.14	2339.70	1624.25	5115.89

Country	2016	2017	2018	2019	2020
Côte d'Ivoire	92.94	37.29	82.48	170.41	22.06
Egypt	1368.59	1565.41	639.54	848.70	925.13
Kenya	1269.52	1081.58	799.63	885.61	1261.94
Madagascar	5.66	:	:	2.00	5.57
Mali	897.30	800.80	96.00	:	:
Nigeria	2.42	2.86	0.10	:	:
South Africa	307.77	344.95	366.46	506.53	288.94
Rwanda	3.54	16.08	53.41	84.53	75.88
Uganda	4208.96	2094.76	3355.55	4873.36	5174.39
Senegal	717.75	714.68	665.41	697.04	1369.92
Togo	341.04	322.22	309.84	278.08	269.06
Sudan				10.61	10.00
Tanzania	:	:	:	0.24	:
Bangladesh	0.15	1.05	:	:	:
Cambodia	6.81	10.77	13.77	37.58	140.51
Japan	0.24	1.24	0.53	1.94	0.38
Jordan	1948.59	2825.54	2293.48	1460.50	795.80
India	13.83	4.45	:	15.61	3.25
Israel	706.70	1184.07	628.52	327.60	146.58
Iran, Islamic Republic of	:	5.80	:	14.00	:
Indonesia	:	:	0.21	2.93	10.35
Malaysia	319.24	368.87	253.99	213.25	7.29
Sri Lanka	10.30	6.57	0.35	23.51	15.29
Philippines	:	:	:	0.86	
Thailand	371.71	361.70	392.81	482.10	435.44
Pakistan	0.40	:	3.85	0.48	10.60
Syria	:	1.00	:	2.88	118.22
Viet Nam	439.72	375.63	338.35	307.70	38.43
Total	15883.47	18916.61	21104.63	22040.91	23669.42

Table C.20: **Potatoes, fresh or chilled (CN code 0701)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/04/2022

Country	2016	2017	2018	2019	2020
United States	1.53	62.76	10.88	60.62	37.07
Mexico	0.05		:	0.14	1.04
Laos	:	0.26	:	:	:
China	0.09	5.00	:	:	0.43
Algeria	5612.00	2489.60	5089.34	6643.02	9440.93
Côte d'Ivoire		9.95			
Egypt	1488601.48	2118574.29	1737561.60	2887875.53	2537298.72
Madagascar	136.52	21.39	35.05	21.54	34.00
Mali	:	:	8.45		
Nigeria	:	:		0.70	1.75
South Africa	2.00	:	:	235.95	:
Zambia	:	135.66	:	:	:
Rwanda	:	:	11.73		:
Uganda	15.15	36.06	4.35	7.01	6.20
Senegal	0.02	:	:	:	:

Country	2016	2017	2018	2019	2020
Togo	:	14.02	27.11	4.58	:
Japan	:	0.01	:	:	:
Jordan	:	:	:	:	2362.37
India	0.01	:	:	:	:
Israel	1366623.28	1311430.16	1257417.27	1303937.89	993329.82
Indonesia	:	0.02	:	:	0.69
Saudi Arabia	:	1300.00	2630.00	1085.00	:
Sri Lanka	:	:	:	0.23	1.24
Thailand	:	0.05	2.05	0.60	:
Taiwan	:	:	0.71	:	:
Syria	:	:	275.00	:	:
Viet Nam	:	:	:	1.95	:
New Caledonia	:	:	0.39	:	:
Total	2860992.13	3434079.23	3003073.93	4199874.76	3542514.26

Table C.21: **Grapes, fresh or dried (CN code 0806)** imported in 100 kg into the EU (27) from regions where *Nipaecoccus viridis* is known to occur (Source: Eurostat accessed on 30/04/2022

Country	2016	2017	2018	2019	2020
United States	191784.90	211054.06	106691.73	95559.91	114324.74
Mexico	:	358.96	:	186.71	184.66
Angola	:	:	0.18	0.80	
China	125769.00	47957.90	87690.22	191986.55	156789.04
Algeria	:	:	0.50	17.17	313.02
Côte d'Ivoire	200.00	:	:	:	:
Egypt	330566.05	404802.55	429995.18	442801.07	463301.46
Kenya	:	:	186.96	:	:
Madagascar	:	:	0.08	:	:
Mauritius	0.02	0.14	:	:	2.22
South Africa	1512476.18	1620130.63	1703622.95	1649404.49	1757286.30
Zambia	0.00	0.28	0.03	:	:
Bangladesh	1.05	:	0.50	:	:
Afghanistan	7469.52	5780.98	24929.08	31135.09	24701.15
Japan	6.03	4.37	1.52	1.19	21.09
Jordan	1.15	:	0.36	:	:
Iraq	:	7.68	12.20	7.82	49.96
India	701938.16	849117.89	741303.06	970130.19	767803.65
Israel	13171.80	7365.66	6433.57	320.43	1083.52
Iran	178916.63	146040.55	101488.05	165329.68	201689.92
Indonesia	:	:	:	:	1.92
Saudi Arabia	0.00	1.51	45.00	0.04	0.01
Sri Lanka	:	:	0.00	:	:
Australia	30009.97	24989.40	28005.60	24170.86	18763.02
Singapore	4.34	603.53	3.49	1.75	3.66
Philippines	0.48	:	:	:	:
Thailand	1.63	92.32	4.46	0.87	1.38
Oman	0.00	:	:	:	0.00
Pakistan	6148.97	10762.89	14655.68	13385.60	11092.98
Syria	0.25	:	2.10	2.73	2.73

Country	2016	2017	2018	2019	2020
Viet Nam	:	0.00	:	0.00	10.14
Total	3098466.13	3329071.30	3245072.50	3584442.95	3517426.57