SCIENTIFIC REPORT

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Update of the *Xylella* spp. host plant database – systematic literature search up to 30 June 2019

European Food Safety Authority (EFSA)

Abstract

Following a request from the European Commission, EFSA was asked to create and regularly update a database of host plant species of Xylella spp. In 2018, EFSA released a new Xylella spp. host plant database that was now updated with informative data extracted from 76 recent publications retrieved through an extensive literature search. This report is related to the third version of the database published in Zenodo in the EFSA Knowledge Junction community, covering articles selected from: a systematic literature review conducted up of 30 June 2019; Europhyt database up to 15 October 2019; and relevant articles identified by EFSA Horizon scanning and personal communications from experts. Some data on Xylella fastidiosa strains and geographical coordinates included in the already published database were updated or modified with the purpose of increasing the accuracy and consistency of the database itself. Thirty-seven new host plant species of X, fastidiosa, identified through the data extracted from the selected publications, have been added to the database. Those plant species were reported as naturally infected, artificially infected or infected under unspecified conditions by subsp. multiplex, pauca or unknown (i.e. not reported in the publication) subspecies of X. fastidiosa. No additional data were retrieved for Xylella taiwanensis. Six new Sequence Types (STs) have been identified in Brazil, Italy and the USA. Information on the tolerant/resistant response of plant species or varieties to X. fastidiosa infection are also reported in the database. The overall number of Xylella spp. host plants reaches now 343 plant species, 163 genera and 64 families determined with two different detection methods, till 595 plant species, 275 genera and 85 families regardless the detection method applied. The EFSA database on Xylella spp. host plants is updated regularly with the aim to provide information and scientific support to risk assessors, risk managers and researchers dealing with *Xylella* spp.

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Keywords: *Xylella* spp., *Xylella fastidiosa*, host plants, database, data extraction, subspecies, sequence types

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1. Introduction

1.1. Terms of Reference as provided by the requestor

In the context of Article 31 of Regulation (EC) No 178/2002, EFSA was asked by the European Commission DG SANTE to provide technical assistance in the field of plant health as regards the regulated harmful organism *Xylella fastidiosa*, as per letter to EFSA's Director dated 30th June 2016 (Reference ARES(2016)3126989).

EFSA was requested to further specify and update the host plants database of *X. fastidiosa* available in 2016 (EFSA, 2016) taking into account the different *X. fastidiosa* subspecies and strains (with particular reference to the European isolates), with the inclusion of information on non-susceptible plants and varieties and negative results of diagnostic tests when available. EFSA was requested to maintain and update this database periodically and to make new releases available on the EFSA website, together with a scientific report. Such report should specify the list of plants confirmed to be infected by at least two detection methods in field conditions or via vector transmission under experimental conditions and be published at least annually, or according to needs following agreements between EFSA and the European Commission. Such request is for the period 2016–2020.

1.2. Interpretation of the Terms of Reference

Following this request, European Food Safety Authority (EFSA) delivered in September 2018 a renovated and updated database of host plants of *Xylella* spp., taking into account both species of the genus *Xylella* (*X. fastidiosa* and *X. taiwanensis*) (EFSA, 2018). A systematic approach was applied according to the EFSA guidance on systematic literature review (EFSA, 2010) and detailed information on host plants, infection methods, geographic location, pest genetics, detection techniques and host status were collected from more than 850 references. The data structure of such database was renewed in order to improve consistency and transparency, and raw data and interactive reports were published in Zenodo¹ in the EFSA Knowledge Junction community and in Microstrategy² platform, together with a Scientific Report.

As per Terms of Reference (ToR), EFSA was requested to maintain and update the *Xylella* spp. host plant database periodically, and to publish new releases online together with a report. This Scientific Report provides an update on the database of host plants of *Xylella* spp. published in 2018 (EFSA, 2018). An extensive literature search was conducted to retrieve recent publications on the topic and new informative data on host plant species of *Xylella* spp. were collected. Such report provides information on the literature review and a detailed view on the currently known host plants of *Xylella* spp.

2. Data and methodologies

The methodologies developed for the *Xylella* spp. host plant database published in 2018 (EFSA, 2018) were applied in this report.

The process was divided in the following steps:

- Extensive literature search to identify relevant references.
- Selection of studies based on title, abstract and full text.
- Data extraction of relevant information.
- Update of some data already inserted in the *Xylella* spp. host plants database published in 2018.
- Data analysis and reporting.

2.1. Extensive literature search

The review question 'Which plant species can host *Xylella/Xylella* associated disease?' was broken down into key stages using the P/O conceptual model described in the EFSA systematic review guidance (EFSA, 2010):

• Population of interest (P)

The population of interest is that of plant species, worldwide.

• Outcome (condition of interest) (O)

¹ https://doi.org/10.5281/zenodo.1339343

² https://www.efsa.europa.eu/en/microstrategy/xylella



The outcome (condition of interest) is that of *Xylella* spp. infection.

Two main elements were considered for the extensive literature search: the sources of information (Table 1) to be consulted and the search strategy (Table 2).

2.1.1. Information sources

The search strategy was run in all databases listed in Table 1 via the Web of Science (Clarivate Analytics) and Scopus platforms with no language or document type restriction.

	Table	1:	Sources	of	information
--	-------	----	---------	----	-------------

Database	Platform
Scopus	Scopus
BIOSIS Citation Index	Web of Science
CABI: CAB Abstracts [®]	
Chinese Science Citation DatabaseSM	
Current Contents Connect	
Data Citation Index	
FSTA [®] - the food science resource	
KCI-Korean Journal Database	
MEDLINE®	
Russian Science Citation Index	
SciELO Citation Index	
Web of Science Core Collection	
Science Citation Index Expanded	
Social Sciences Citation Index	
Arts & Humanities Citation Index Conference Proceedings Citation Index	
Conference Proceedings Citation Index- Science & Humanities	
Book Citation Index - Science	
Book Citation Index – Social Sciences & Humanities	
Emerging Sources Citation Index	
Current Chemical Reactions	
Index Chemicus	
Zoological Record	

2.1.2. Search terms

The syntax of the search string, developed for the *Xylella* spp. host plants database published in 2018 (EFSA, 2018), was adapted and run into each platform databases listed in Table 1 on 30 June 2019. As the scope of the search was to retrieve references published after September 2017, the selected time span was from 30 September 2017 up to 30 June 2019. The search strings and the number of retrieved references are shown in Table 2.



Platform	Query	Results
Scopus	(TITLE-ABS-KEY (xylella OR xyllela OR xylela OR (pierce* W/2 disease) OR (((plum OR plums) AND "leaf scald*")) OR ((phony W/2 (peach* OR disease*))) OR ((citrus AND variegat* AND chlorosis)) OR crespera OR "almond leaf scorch*" OR "bacterial leaf scorch*" OR "coffee leaf scorch*" OR "mulberry leaf scorch*" OR "oleander leaf scorch*" OR "sycamore leaf scorch*" OR "Periwinkle wilt" OR "Ragweed stunt" OR ((olive W/50 "quick decline syndrome")) OR "Xylem inhabiting bacteri*" OR "Xylem limited bacteri*" OR fxib OR fxjb OR "rickettsialike bacteri*" OR "rickettsia like bacteri*")) AND (ORIG-LOAD-DATE > 20170930 AND ORIG-LOAD-DATE < 20190701)	160
Web of Science	TS=(xylella OR xyllela OR xylela OR (pierce* NEAR/2 disease) OR (((Plum OR plums) AND "leaf scald*")) OR ((Phony NEAR/2 (peach* OR disease*))) OR ((citrus AND variegat* AND chlorosis)) OR crespera OR "almond leaf scorch*" OR "bacterial leaf scorch*" OR "coffee leaf scorch*" OR "mulberry leaf scorch*" OR "oleander leaf scorch*" OR "sycamore leaf scorch*" OR "Periwinkle wilt" OR "Ragweed stunt" OR ((Olive NEAR "quick decline syndrome")) OR "Xylem inhabiting bacteri*" OR "Xylem limited bacteri*" OR FXIB OR FXJB OR "rickettsialike bacteri*" OR "rickettsia like bacteri*")	269

Table 2:Search strings and results

The collected records were downloaded and imported into an EndNote X9 library (Clarivate Analytics). Duplicates were removed using EndNote X9 and the remaining references were uploaded on DistillerSR online³ together with the full texts in portable document format (pdf).

Nine additional documents containing relevant information were obtained from research groups, personal communications of experts, EFSA Horizon Scanning for Plant Health⁴ and Europhyt outbreak notifications⁵ (accessed on 15 October 2019).

2.2. Study selection

The collected references were screened for relevance in two steps:

- 1) Title and abstract screening.
- 2) Full-text screening of the references that passed the first step.

Inclusion/exclusion criteria were applied in each step and two reviewers worked in parallel screening the references.

The first step required the reviewers to answer two questions, listed in Table 3, considering only title and abstract of the references. The aim of this step was to select only references presenting original research data on *Xylella* or *Xylella*-associated disease.

Question text	Type of answer	Answer text	Exclusion criteria
Is <i>Xylella</i> /a <i>Xylella</i> -associated disease/a <i>Xylella</i> synonym the topic of the study?	Only one of the possible alternative answers can be selected	Yes No	Included Excluded
Is it a primary research study?	Only one of the possible alternative answers can be selected	Yes No	Included Excluded

Table 3: Inclusion/exclusion criteria for title and abstract screening

The references that passed the first step were submitted to the full text screening. This second step required the reviewers to answer to four questions (Table 4): three of them are descriptive (neutral) whereas the fourth has an inclusion/exclusion role.

³ https://www.evidencepartners.com/

⁴ https://efsa.onlinelibrary.wiley.com/doi/toc/10.2903/(ISSN)1831-4732.Horizon-scanning-for-plant-health

⁵ https://ec.europa.eu/food/plant/plant_health_biosecurity/harmful_organism_outbreaks_en

Question text	Type of answer	Answer text	Exclusion criteria
Is an English abstract	Only one of the possible alternative	Yes	Neutral
present?	answers can be selected	No	Neutral
Which is the type of the	Only one of the possible alternative	Peer-reviewed article	Neutral
publication?	answers can be selected	Article	Neutral
		Book	Neutral
		Conference proceedings	Neutral
		Abstract	Neutral
		Technical publication/Report	Neutral
		Other	Neutral
Is the Xylella host plant the	Only one of the possible alternative	Yes	Neutral
main scope of the study?	answers can be selected	No	Neutral
Is Xylella/a Xylella-associated	Only one of the possible alternative	Yes	Included
disease/a <i>Xylella</i> synonym studied in association to a host plant?	answers can be selected	No	Excluded

Table 4:	Inclusion/exclusion	criteria	at full	text	screening
	,				

2.3. Data extraction

Informative data listed in Table 5 were extracted from the selected references. For each reference, the first reviewer performed the data extraction whereas the second reviewer conducted the quality check of the extracted data.

Extracted data	Description
General information	In this section, the general information about the study is reported
RecordID	Unique number allocated to each row
RefID	Unique number allocated to each reference within the DistillerSR software
Reference	Full reference
Publication year	Year of the publication
Starting year	Starting year of the study, as reported in the publication
Ending year	Ending year of the study, as reported in the publication
Botanical identification	The botanical identification of the plant, both as reported in the publication and according to the updated taxonomy of the EPPO Global Database ⁴ , is reported in this section
Plant EPPO code	EPPO code of the plant species, from the EPPO global database. ⁶ For plant species not present in the EPPO global database, a new code was created in the EFSA catalogue.
Plant family	Plant family, from the EPPO global database ⁴
Plant genus	Plant genus, from the EPPO global database ⁴
Plant species	Plant species, from the EPPO global database ⁴
Reported plant species	Name of the plant species as reported in the publication
Common name	Common name of the plant species, as reported in the publication
Cultivar	Cultivar or plant variety, as reported in the publication

Table 5:	Data	extraction	structure
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⁶ https://gd.eppo.int/



Extracted data	Description
Infection information	Detailed information about the infection and location of the plant is reported in this section
Infection method (Level 1)	The infection of the plant can be natural, artificial or not specified
Infection method (Level 2)	Subcategories of natural infection: during survey activity, during research activity. 'Research activity' is used when plants are planted under natural inoculum pressure and infection development was monitored without interfering Subcategories of artificial infection: mechanical inoculation (detailed at level 3a), vector transmission (detailed at level 3b)
Mechanical inoculation (Level 3a)	Subcategories of mechanical inoculation: budding, grafting, needle, root uptake, stem absorption, syringe
Infection vector species (Level 3b)	Insect species used in the artificial vector transmission
Location type	The place where the plant was placed: natural habitat, greenhouse, screenhouse, interception, not specified
Geographic information	In this section, the geographical location of the plant is reported, as detailed as possible. In case of intercepted plant, the reported location is the geographical origin of the plant and not the country and location where it was intercepted
Country code	From the EFSA catalogue, based on NUTS (Eurostat) and GAUL (FAO) territorial unit nomenclature
Country	From the EFSA catalogue, based on NUTS (Eurostat) and GAUL (FAO) territorial unit nomenclature
Location	Location description (state/region/province/municipality) from the EFSA catalogue, based on NUTS (Eurostat) and GAUL (FAO) territorial unit nomenclature
Additional Location	Additional information on the location, as reported in the publication
Coordinates precision	Coordinates as reported in the publication
Latitude	Latitude, as reported in the publication
Longitude	Longitude, as reported in the publication
Pest description	Information about the pest is reported in this section, together with genetic data
Pest EPPO code	EPPO code of the pest, from the EPPO global database ⁴
Pest species	Name of <i>Xylella</i> spp., from the EPPO global database ⁴
Pest subspecies	<i>Xylella fastidiosa</i> subspecies, from the EPPO global database. ⁴ If the subspecies is inferred from another publication, a note is added in the genotyping comment
Reported pest	Name of <i>Xylella</i> spp. as reported in the publication (from 1930 up to now): Alfalfa dwarf virus, Morus suffodiens virus, Phony peach bacterium, Pierce's disease bacterium, Pierce's disease virus, <i>Rickettsia</i> -like bacteria, Rod-shaped bacteria, <i>Xylella fastidiosa, Xylella taiwanensis</i> , Xylem-inhabiting bacteria
Disease	Name of the disease caused by <i>Xylella</i> spp., as reported in the publication: Alfalfa dwarf, Almond leaf scorch, Bacterial leaf scorch, Blueberry bacterial leaf scorch, Citrus variegated chlorosis, Coffee leaf scorch, Crespera, Elm leaf scorch, Leaf scorch disease, Mulberry leaf scorch, Oleander leaf scorch, Olive quick decline syndrome, Pear leaf scorch, Pecan bacterial leaf scorch, Periwinkle wilt, Phony peach disease, Pierce disease, Plum leaf scorch
Strain	Name of the strain of Xylella spp., as reported in the publication
MLST (Multilocus Sequence Type)	Sequence Type (ST) of <i>Xylella fastidiosa,</i> as reported in the publication. If the ST is inferred from another publication, a note is added in the genotyping comment
Genotyping comment	Comment or additional information regarding the pest
Methods of identification	In this section, the identification methods applied to detect Xylella spp. infection are listed. Eight detection methods were considered and for each of them, the outcome of the analysis (positive or negative), together with the number of infected plants and the total number of analysed plants, were reported. Moreover, additional information could be added in the comment column beside each detection method
Symptoms	Observation of symptoms in the plant, as reported in the publication
Symptoms expression in test plants	Observation of symptom development in test plants after an attempt to transmit the pathogen through vectors



Extracted data	Description
Culture	Isolation of cultivable bacteria from tissue samples on solid culture media
Microscopy	Observation of Xylella spp. bacteria through microscopic analysis techniques
ELISA	Enzyme-linked immunosorbent assay
Other immunological techniques	Immunological techniques other than ELISA
PCR-based methods	Polymerase chain reaction-based methods (PCR, nested PCR, qPCR, etc.)
Sequencing	Sequence analysis
Host status	Information about the tolerance and resistance response of the plant
Tolerance/Resistance reported	Tolerant/Resistant status of the plant, as reported in the publication
Tolerance/Resistance category	Categories describing the response of the tolerant/resistant plant: lack of infection or negative reading, lack of systemic movement, lack or reduction of symptoms, lack or reduction of symptoms – lower bacterial population, lack or reduction of symptoms – lower bacterial population – lower disease incidence, lack or reduction of symptoms – lower disease incidence, lower bacterial population, lower bacterial population – lower disease incidence, lower bacterial population – lower disease incidence, lower disease incidence, infection not persistent, reported as tolerant/resistant (no details)
Tolerance/Resistance comment	Comment on the tolerant/resistant response of the plant, as reported in the publication
Additional information	
Comment	Additional relevant information or comment on the study
Confirmed record	'Yes' for confirmed records, 'No' for unconfirmed/dubious records. Unconfirmed records were included in the data extraction but excluded from the data analysis

2.4. Data updated in this database version

Some information already included in the *Xylella* spp. host plant database published in 2018 were updated, with the purpose of increasing accuracy and consistency of the database itself.

References containing *X. fastidiosa* strains for which the subspecies was not reported in the publication were cross-checked with other references in the attempt of identifying the subspecies to which the strain belongs. In some cases, the author of the reference was contacted to ask additional information on the genotyping of the strain. Whenever the subspecies was identified, it was inserted in the related record and a comment was added in the genotyping comment's column.

The section on geographical coordinates have been modified and updated. Column 'Location' includes the administrative location description according to NUTS (Eurostat, for EU countries) or GAUL (FAO, for the rest of the world) territorial unit nomenclature and more precise administrative information if available in the publication. Additional information reported in the publication, such as the research centre name or the experimental field station where the study was conducted, are specified in the new column 'Additional Location'.

The geographical coordinates were inserted only when explicitly reported in the publication. Other geographical coordinates previously present in the database and inferred from different sources have been removed for consistency with the related documents and for avoiding misunderstandings in relation (e.g.) to extrapolated geographical features. For further information on the origin and on what exactly those coordinates are referred to, the publication should be consulted.

Records present in the update published in 2018 and containing information that have been afterwards updated (such as from Europhyt notifications, or from ongoing artificial infection experiments) have been modified with the most updated information and results.

2.5. Data warehouse

A harmonised data model has been established to collect data on Xylella spp. host plants. The aim was to establish a harmonised data flow for the collection and the collation of an extensive literature review generated data in the plant health domain. Data are stored in EFSA Scientific Data Warehouse (S-DWH), after that an ETL (Extract, Transform, Load) procedure is applied in order to harmonise and calculated the statistics.

2.5.1. Data management

The collected data have been submitted to the EFSA Data Collection Framework (DCF). DCF is the upfront system in the EFSA pipeline of data collection tools and allows a first step of harmonisation against the EFSA controlled reference terminology (aka EFSA catalogues). Data have been then included in the S-DWH by means of a standardised Extract Transform Load (ETL) procedure and they have been further analysed and managed to generate needed statistics.

Data are available as interactive reports on the Microstrategy platform at the following link: https://www.efsa.europa.eu/en/microstrategy/xylella

Raw data and related metadata are published in Zenodo in the EFSA Knowledge Junction community, this report refers to version 3 (https://doi.org/10.5281/zenodo.1339343).

2.5.2. Data reporting

Data reporting was designed to distinguish the *Xylella* spp. host plant species, based on the number and type of detection methods applied for each finding. Different combinations of detection methods were considered:

- A) Plant species positive with at least two detection methods (among: symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture) or positive with one method (between: sequencing, culture).
- B) The same as point A, but also including microscopy: plant species positive with at least two detection methods (among: microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture) or positive with one method (between: sequencing, culture).
- C) Plant species positive with at least one detection method (among: symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture).
- D) Plant species positive with at least one detection method including microscopy (microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture).
- E) All positives plant species reported, regardless of the detection methods (positive records but without the detection method specified, symptom observations, microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing, culturing).

3. Results

3.1. Results of the literature review

3.1.1. Collected literature and screening for relevance

The extensive literature search was conducted on 30 June 2019 on Web of Science and Scopus platforms and 429 references were collected. Duplicates were removed and 262 references were uploaded in DistillerSR and screened for relevance. Results of the screening process are shown in Figure 1.

In the first step, i.e. title and abstract screening, 109 references were excluded either because they do not focus on *Xylella* or *Xylella*-associated diseases and/or they are not primary research studies. The selected 153 references were subjected to the second step of the screening process, i.e. the full text screening. Sixty-seven references, in which *Xylella* spp. is studied is association to a host plant (i.e. *in vivo*), were selected and informative data listed in Table 5 were extracted.

Nine additional references retrieved through personal communication of experts, EFSA Horizon Scanning for Plant Health⁷ and Europhyt outbreak notifications and containing informative data were included in the data extraction.

⁷ https://efsa.onlinelibrary.wiley.com/doi/toc/10.2903/(ISSN)1831-4732.Horizon-scanning-for-plant-health







3.1.2. Unconfirmed studies

Compared to the previous version of the database, two additional publications and one single record were considered unconfirmed/dubious. Those unconfirmed studies are included in the data extraction but excluded from the data analysis.

The paper of Li et al. (2002) reporting experimental infection of *Vitis vinifera* plants was considered unconfirmed/dubious because, as stated by the EFSA PLH Panel (2015), an aggressive inoculation procedure was used, making difficult to discriminate between stress induced by the treatment and the disease caused by the pathogen itself.

One record regarding a positive PCR result in one *Quercus pubescens* plant artificially inoculated by *X. fastidiosa* subsp. *pauca* strain CoDiRO was considered unconfirmed/dubious as the publication reports that further confirmation tests still need to be performed (Technical report of POnTE and XF-Actors, 2017), but no updated results have been published so far.

The paper by Naqvi et al. (2017) reporting the presence of *Citrus* plants affected by Citrus variegated chlorosis in Pakistan was considered unconfirmed/dubious as the presence of *X. fastidiosa* and its related citrus disease has never been confirmed in this country.

3.2. Update of records already included in the database published in 2018

The records already included in the database published in 2018 (EFSA, 2018) and for which no *X. fastidiosa* subspecies was assigned to the strain reported in the publication were cross-checked with



the references cited in the publication and/or the author of the article was contacted in order to identify the *X. fastidiosa* subspecies. Whenever the subspecies was identified, it was inserted in the related record and a comment on the source of information was inserted in the genotyping comment's column. A *X. fastidiosa* subspecies was assigned to 734 records, of which 356 and 306 records were assigned to the subspecies *fastidiosa* and *pauca*, respectively. One record was identified as belonging to the species *X. taiwanensis* instead of *X. fastidiosa* subsp. unknown. In 58 records, it was also possible to assign the Sequence type (ST) to the strain, thanks to personal communications of the authors of the publications.

Following the new rationale for reporting geographic coordinates (see Section 2.4), coordinates were included only when specified in the related publications. Such coordinates may refer to single plants, fields or administrative divisions at different level (town, province, regions etc.) and with different level of precision. For more information on the reported geographical coordinates, the related publication was the only source of information that was consulted for this database.

3.3. Host plant species of *Xylella* spp.

The updated total numbers of plant species, genera and families host of *Xylella* spp., according to the classification system described in Section 2.5.2, are reported in Table 6. The numbers vary from 343 host plant species, 163 genera and 64 families according to category A (i.e. plant species positive with at least two detection methods (among: symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture) or positive with one method (between: sequencing, culture)) to 595 plant species, 275 genera and 85 families of category E (i.e. all positives plant species reported, regardless of the detection methods). Due to the update of some data already present in the first version of the database (EFSA, 2018), some host plants already present in the database were reclassified in a different category.

Table 6:	Number of host plant species, genera and families of Xylella spp. according to categories
	A, B, C, D, E (based on the detection methods applied – see Section 2.5.2)

	Α	В	С	D	E
Number of host plant species	343	348	578	587	595
Number of host genera	163	164	274	274	275
Number of host families	64	64	85	85	85

Compared to the database published in 2018 (EFSA, 2018), 37 new host plant species have been identified for *X. fastidiosa*. Three plant species have been removed from the list of host plants: data on *Citrus volkameriana* (reported infected by *X. fastidiosa* in unspecified conditions) were erroneously interpreted, data on *Prunus* \times *amygdalo-persica* artificially infected by *X. fastidiosa* subsp. *pauca* strain CoDiRO were updated, while the plant species *Quercus publescens* has been now considered as unconfirmed (see Section 3.1.2). Details on those 37 new host plants are reported in Table 7. No new host plant species have been identified for the species *X. taiwanensis*.

Thirty new plant species have been identified as host plants of *X. fastidiosa* according to category A, and seven according to category C (as described in Section 2.5.2). Most of the new host plant species were naturally infected and identified both in the EU (France, Italy, Portugal and Spain) and outside the EU (Iran and the United States of America). *Pistacia vera* was also tested in experimental conditions and three plant taxa (*Hibiscus fragilis, Hibiscus* sp., *Vaccinium darrowii*) were reported infected in not specified conditions. The *X. fastidiosa* subspecies identified in the new host plants were *multiplex, pauca* or not reported (unknown).

Table 7: New host plants of *X. fastidiosa.* For each host plant, the infection method (natural, artificial or unspecified), the country (only for natural infections), the *X. fastidiosa* subspecies (*pauca, multiplex* or unknown (i.e. not reported in the publication)) and the category (A or C – see Section 2.5.2) are reported

Plant species	Infection method	Country	X. fastidiosa subspecies	Category
Amaranthus retroflexus	Natural	Italy	раиса	А
Amaranthus retroflexus	Natural	Italy	unknown	А
Artemisia sp.	Natural	Portugal	multiplex	А



Plant species	Infection method	Country	X. fastidiosa subspecies	Category
Calicotome sp.	Natural	France	unknown	С
Campsis radicans	Natural	United States	unknown	С
Chamaesyce canescens	Natural	Italy	раиса	Α
Cistus albidus	Natural	Spain	unknown	А
Cistus × incanus	Natural	Italy	multiplex	С
Convolvulus cneorum	Natural	France	multiplex	А
Cytisus spinosa	Natural	France	multiplex	Α
Diospyros kaki	Natural	United States	unknown	A
Elaeagnus angustifolia	Natural	Italy	multiplex	Α
Erigeron karvinskianus	Natural	France	multiplex	А
Erigeron sp.	Natural	Italy	pauca	А
Euryops pectinatus	Natural	France	multiplex	A
Hebe elliptica	Natural	France	multiplex	А
Helichrysum sp.	Natural	Italy	multiplex	A
Helichrysum stoechas	Natural	France	multiplex	A
Helichrysum stoechas	Natural	Spain	unknown	А
Hibiscus fragilis	Not specified		pauca	А
Hibiscus sp.	Not specified		pauca	A
Ilex aquifolium	Natural	Portugal	multiplex	A
Lavandula latifolia	Natural	Spain	unknown	А
Ligustrum sinense	Natural	United States	unknown	С
Medicago arborea	Natural	France	multiplex	А
Osteospermum ecklonis	Natural	France	multiplex	A
Osteospermum fruticosum	Natural	Italy	pauca	А
Phlomis fruticosa	Natural	France	multiplex	A
Pistacia vera	Artificial		multiplex	А
Pistacia vera	Natural	Iran	multiplex	A
Prunus serotina	Natural	United States	unknown	С
Robinia pseudoacacia	Natural	United States	multiplex	A
Santolina chamaecyparissus	Natural	France	multiplex	A
Strelitzia reginae	Natural	France	multiplex	A
Teucrium capitatum	Natural	Spain	unknown	A
Ulex europaeus	Natural	Portugal	multiplex	Α
Ulex minor	Natural	Portugal	multiplex	A
Vaccinium ashei	Natural	United States	multiplex	A
Vaccinium ashei	Natural	United States	unknown	A
Vaccinium darrowii	Not specified		unknown	С
Vaccinium elliottii	Natural	United States	unknown	С

The overall number of host plant species infected naturally, artificially and in unspecified conditions by the different *X. fastidiosa* subspecies and according to the different categories are reported in Tables 8, 9 and 10, whereas the pathogen species *Xylella taiwanensis* was recorded only in the plant species *Pyrus pyrifolia*.

Considering the plant species naturally infected, the highest number of host plants is recorded for the subspecies *multiplex* (141 plant species for cat. A) and for unknown *X. fastidiosa* subspecies (152 plant species for cat. A, increasing to 371 for cat. E). The highest number of plant species artificially infected by *X. fastidiosa* is recorded for unknown subspecies (89 plant species for cat. A, rising to 2015 for cat. E) and for the subspecies *fastidiosa* (37 for cat. A).

Table 8: Number of host plant species, naturally infected, susceptible to the different *X. fastidiosa* subspecies according to categories A, B, C, D, E

Category	fastidiosa	fastidiosa/ sandyi	morus	multiplex	pauca	sandyi	tashke	unknown
Α	39	2	4	141	45	6	1	152
В	39	2	4	141	45	6	1	157
С	43	2	4	146	47	7	1	354
D	43	2	4	146	47	7	1	360
E	44	2	4	147	47	7	1	371

Table 9: Number of host plant species, artificially infected, susceptible to the different *X. fastidiosa* subspecies according to categories A, B, C, D, E

Category	fastidiosa	morus	multiplex	pauca	sandyi	tashke	unknown
Α	37	2	18	15	5	0	89
В	38	2	18	16	5	0	94
С	50	2	22	24	6	1	201
D	50	2	22	24	6	1	207
E	53	2	23	24	6	1	215

Table 10: Number of host plant species, infected in unspecified conditions, susceptible to the different *X. fastidiosa* subspecies according to categories A, B, C, D, E

Category	fastidiosa	multiplex	pauca	sandyi	unknown
Α	7	13	8	1	16
В	7	13	8	1	18
С	7	16	8	2	27
D	7	16	8	2	29
E	7	16	8	2	31

The plant species behind the numbers shown in Tables 8, 9 and 10 are listed in Appendices A, B and C. In those appendices, the full lists of plant species infected by the different *X. fastidiosa* subspecies naturally, artificially and in not specified conditions according to the five categories are shown.

The 'top 10' host plant families, i.e. the families owning the highest numbers of host plant species, are shown in Figure 2. Fabaceae appears to be the plant family owning the highest number of host plants (61), followed by Asteraceae (57) and Vitaceae (48).



Top 10 host plant families



Figure 2: This figure shows the top 10 host plant families for *Xylella* spp. and the number of host plant species within each family

Infection by *Xylella* spp. can be detected using different detection techniques, sometimes providing non-convergent results (i.e. the sample is positive to one or more detection methods but negative for others). Records reporting non-convergent results are reported in the database but have not been included in the data analysis.

3.4. X. fastidiosa Sequence Types and host plants association

The full list of plant species infected by the different *X. fastidiosa* Sequence Types (ST) in natural, artificial and not specified conditions is reported in Appendix D. For each plant species, the number of records reporting infection by that specific ST is counted. For natural infection, it is also reported the country where the plant species have been identified, whereas for artificial and not specified infection only, the total number of records is present in the Appendix.

Totally, 1,202 records reporting information on 194 plant species infected by 87 different STs have been reported in the database. Most of the records (884) refer to natural infections that were reported in North, Central and South America (United States of America, Mexico, Honduras, Costa Rica, Ecuador, Brazil and Argentina) and Europe (Portugal, Spain, France and Italy). The highest number of records for artificial infections belong to STs of subsp. *pauca* (127 records), whereas ST1 (subsp. *fastidiosa*) is the most studied ST with 95 records.

Compared to the previous version of the database (EFSA, 2018), six new STs have been identified worldwide. In the United States of America, *Vaccinium ashei* has been reported as infected by STs 82 and 83 (subsp. *multiplex*), and in Brazil STs 84, 85 and 86 (subsp. *pauca*) have been identified in *Olea europaea* plants. In Italy, ST 87 belonging to subsp. *multiplex* has been detected in several plant species in Monte Argentario (Tuscany).

3.5. Tolerant and resistant response of plant species

Information on tolerant and resistant response of plant species to *X. fastidiosa* infection have been also reported in the database. The list of plant genera and species for which tolerant and resistant response have been identified is reported in Table 11. Information on tolerant/resistant status have been reported in 64 plant species with a total number of 491 records, but the most studied genera are *Vitis, Citrus* and *Prunus* (224, 175 and 54 records, respectively), reflecting the important economic value of their plant species.



Plant genus and species	Number of records
Arabidopsis	4
Arabidopsis thaliana	4
Citrus	175
Citrus celebica	1
Citrus clementina	4
Citrus iambhiri	2
Citrus junos	1
Citrus latifolia	1
Citrus limettioides	1
Citrus limon	14
Citrus medica	1
Citrus natsudaidai	1
Citrus paradisi	5
Citrus reticulata	9
Citrus reticulata \times C. sinensis \times C. paradisi	1
Citrus sinensis	8
Citrus sp.	70
Citrus tangerina	32
Citrus × nobilis	11
Citrus × tangelo	13
Coffea	5
Coffea arabica	4
Coffea sp.	1
Fortunella	1
Fortunella margarita	- 1
Medicago	2
Medicago sativa	2
Olea	14
Olea europaea	14
Platanus	2
Platanus sp.	2
Poncirus	3
Poncirus trifoliata	3
Prunus	54
Prunus angustifolia	1
Prunus armeniaca	3
Prunus avium	5
Prunus cerasus	2
Prunus domestica	3
Prunus dulcis	8
Prunus persica	7
Prunus salicina	10
Prunus sp.	13
Prunus × amvadalo-persica	2
Quercus	2
Quercus ilex	2
Vaccinium	5
Vaccinium corvmbosum	5
	-

Table 11: Number of records reporting tolerant/resistant response for plant genus and species



Plant genus and species	Number of records
Vitis	224
Vitis aestivalis	2
Vitis arizonica	5
Vitis arizonica hybrid	6
Vitis arizonica × V. rupestris	6
Vitis arizonica × V. vinifera	1
Vitis arizonica/candicans	3
Vitis arizonica/candicans × V. rupestris	2
Vitis arizonica/girdiana	1
Vitis berlandieri × riparia hybrids	6
Vitis berlandieri × V. rupestris	4
Vitis candicans	2
Vitis cinerea × V. berlandieri	2
Vitis girdiana	2
Vitis munsoniana	3
Vitis popenoei	1
Vitis rotundifolia	58
Vitis rotundifolia × V. rupestris	1
Vitis simpsonii	1
<i>Vitis</i> sp.	76
Vitis tiliaefolia	1
Vitis vinifera	25
Vitis aestivalis var. smalliana	4
Vitis aestivalis var. smalliana × V. simpsonii	4
Vitis aestivalis var. smalliana $ imes$ V. vinifera	1
Vitis nesbittiana	1
Vitis rufotomentosa	1
Vitis shuttleworthii	5
TOTAL	491

Eleven categories have been created to group different tolerant/resistant response to *X. fastidiosa* infection. Those categories include the plant response/s for which the authors of the publication considered that plant as tolerant/resistant to *X. fastidiosa* infection. One hundred and eight publications, recorded in 491 record (245 for artificial infections), report information on tolerance and resistance outcome to *X. fastidiosa* infection (Table 12). In 41 publications, the authors consider the plant tolerant or resistant, but without adding further details, whereas in 19 publications, the lower bacterial populations harboured by the plant was considered the demonstration of the tolerant/resistant status of the plant. With more than 70 records, the lack of infection and lack or reduction of symptoms (in both natural and artificial infections) are the two most reported tolerant/resistant outcome.



	N	Number of records			
Tolerance/resistance category	Natural infection	Artificial infection	Infection not specified	publications	
Lack of infection or Negative reading	78	42		14	
Lack of systemic movement		50		7	
Lack or reduction of symptoms	75	74		10	
Lack or reduction of symptoms – Lower bacterial population	3	12		7	
Lack or reduction of symptoms – Lower bacterial population – Lower disease incidence	2			2	
Lack or reduction of symptoms – Lower disease incidence	2			1	
Lower bacterial population	6	46		19	
Lower bacterial population – Lower disease incidence	2			2	
Lower disease incidence	4			2	
Not persistent infection	3	5		3	
Reported as tolerant/resistant_no details	22	16	49	41	
TOTAL	197	245	49	108	

Table 12: Number of records and publications for tolerance/resistance category

4. Conclusions

Following a request of the European Commission, EFSA was asked in 2016 to create, maintain and regularly update a database of host plant species of *Xylella* spp. In 2018, EFSA released a new and renovated *Xylella* spp. host plant database (EFSA, 2018), that was now updated.

An extensive literature search was performed including all scientific papers published up to 30 June 2019, as well as additional documents obtained from research groups, personal communications of experts, EFSA Horizon Scanning activities for Plant Health and Europhyt outbreak notifications (last accessed on 15 October 2019). By these searches, 271 recent publications were collected and screened to select the publications in which *Xylella* spp. was studied in association with a plant species. As a result, 76 publications were selected and informative data on botanical identification of the plant species, infection method, geographical information, *Xylella* spp. genetics, detection techniques and tolerant/ resistant response of the plant were extracted.

Some data already included in the database published in 2018 were updated: in particular, the *X. fastidiosa* subspecies was identified for several strains, thanks to references review and author's personal communications; in this update, only geographical coordinates explicitly reported in the publications were reported.

Thirty-seven new host plant species of *X. fastidiosa* were added to the database. Most of those plant species were naturally infected and identified in France, Iran, Italy, Portugal, Spain and the United States of America. *X. fastidiosa* subspecies infecting the new host plants were *multiplex*, *pauca* or not identified (unknown/not reported in the study). No new data were retrieved for *X. taiwanensis* that up to now has been reported only in *Pyrus pyrifolia* plants.

The overall number of *Xylella* spp. host plants reached 343 plant species, 163 genera and 64 families for category A (i.e. plant species positive with at least two detection methods (among: symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture) or positive with one method (between: sequencing, culture), till 595 plant species, 275 genera and 85 families for category E (i.e. all positives plant species reported, regardless of the detection methods).

Since the release of the first version of this database (EFSA, 2018), six new Multilocus Sequence Types (STs) have been identified worldwide: STs 82 and 83 (subsp. multiplex) in the United States of America, STs 84, 85 and 96 (subsp. *pauca*) in Brazil and ST 87 (subsp. *multiplex*) in Italy.

Information on tolerant/resistant status were reported for 64 plant species in 108 publications, with a total number of 491 records. The economically important *Vitis*, *Citrus* and *Prunus* genera are the most studied and reported plant taxa.



The EFSA database on *Xylella* spp. host plants will be updated regularly and it aims to provide useful information and scientific support to risk assessors, risk managers and researchers dealing with *Xylella* spp.

Data are available as interactive reports on the Microstrategy platform at the following link: https://www.efsa.europa.eu/en/microstrategy/xylella

Raw data and related metadata are published in Zenodo in the EFSA Knowledge Junction community, this report refers to version 3 (https://doi.org/10.5281/zenodo.1339343).

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Abbreviations

DCF	Data Collection Framework
EFSA PLH Panel	EFSA Panel on Plant Health
ELISA	enzyme-linked immunosorbent assay
EPPO	European and Mediterranean Plant Protection Organization
ETL	Extract Transform Load
PCR	polymerase chain reaction
S-DWH	EFSA Scientific Data Warehouse
ST	sequence type



Appendix A – Host plant species naturally infected

List of host plant species, naturally infected, of *X. fastidiosa* subsp. unknown (i.e. not reported in the publication), subsp. *fastidiosa*, subsp. *fastidiosa/sandyi*, subsp. *morus*, subsp. *multiplex*, subsp. *pauca*, subsp. *sandyi*, subsp. *tashke* and *X. taiwanensis* according to categories A, B, C, D, E (as reported in Section 2.5.2):

A. Plant species positive with at least two detection methods (among: symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture) or positive with one method (between: sequencing, culture).

B. The same as point A, but also including microscopy: plant species positive with at least two detection methods (among: microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture) or positive with one method (between: sequencing, culture).

C. Plant species positive with at least one detection method (among: symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture).

D. Plant species positive with at least one detection method including microscopy (microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture).

E. All positives plant species reported, regardless of the detection methods (positive records but without the detection method specified, symptom observations, microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing, culturing).

Plant species	Pest	Cat	egory
Acacia saligna	Xf subsp. unknown	A	
Acer rubrum	Xf subsp. unknown	A	
Albizia julibrissin	Xf subsp. unknown	A	
Amaranthus retroflexus	Xf subsp. unknown	A	
Ambrosia psilostachya	Xf subsp. unknown	Α	
Ambrosia trifida	Xf subsp. unknown	A	
Ampelopsis arborea	Xf subsp. unknown	A	
Ampelopsis brevipedunculata	Xf subsp. unknown	A	
Ampelopsis brevipedunculata var. hancei	Xf subsp. unknown	A	
Asparagus acutifolius	Xf subsp. unknown	A	
Baccharis halimifolia	Xf subsp. unknown	A	
Baccharis sp.	Xf subsp. unknown	A	
Brassica sp.	Xf subsp. unknown	A	
Callicarpa americana	Xf subsp. unknown	A	
Carya illinoinensis	Xf subsp. unknown	A	
Catharanthus roseus	Xf subsp. unknown	A	
Cercis occidentalis	Xf subsp. unknown	A	
Chamaecrista fasciculata	Xf subsp. unknown	A	
Chionanthus retusus	Xf subsp. unknown	A	
Chitalpa tashkentensis	Xf subsp. unknown	A	
Cistus albidus	Xf subsp. unknown	A	
Cistus creticus	Xf subsp. unknown	A	
Citrus aurantium	Xf subsp. unknown	A	
Citrus celebica	Xf subsp. unknown	A	
Citrus jambhiri	Xf subsp. unknown	A	
Citrus limon	Xf subsp. unknown	A	
Citrus medica	Xf subsp. unknown	Α	
Citrus natsudaidai	Xf subsp. unknown	A	



Plant species	Pest	Category
Citrus paradisi	Xf subsp. unknown	A
Citrus reticulata	Xf subsp. unknown	A
Citrus sinensis	Xf subsp. unknown	A
Citrus sp.	Xf subsp. unknown	A
Citrus tangerina	Xf subsp. unknown	Α
Citrus × nobilis	Xf subsp. unknown	A
Citrus × tangelo	Xf subsp. unknown	A
Coelorachis cylindrica	Xf subsp. unknown	A
Coffea arabica	Xf subsp. unknown	A
Coffea sp.	Xf subsp. unknown	A
Conium maculatum	Xf subsp. unknown	A
Digitaria sp.	Xf subsp. unknown	A
Diospyros kaki	Xf subsp. unknown	A
Diplocyclos palmatus	Xf subsp. unknown	A
Dodonaea viscosa	Xf subsp. unknown	A
Euphorbia terracina	Xf subsp. unknown	A
Fagus crenata	Xf subsp. unknown	A
Fatsia japonica	Xf subsp. unknown	A
Ficus carica	Xf subsp. unknown	A
Fraxinus pennsylvanica	Xf subsp. unknown	A
Genista $ imes$ spachiana	Xf subsp. unknown	A
Ginkgo biloba	Xf subsp. unknown	A
Grevillea juniperina	Xf subsp. unknown	A
Helianthus annuus	Xf subsp. unknown	A
Helichrysum stoechas	Xf subsp. unknown	A
Hemerocallis sp.	Xf subsp. unknown	A
Hibiscus schizopetalus	Xf subsp. unknown	A
Humulus scandens	Xf subsp. unknown	A
Ilex vomitoria	Xf subsp. unknown	A
Iva annua	Xf subsp. unknown	A
Jacaranda mimosifolia	Xf subsp. unknown	A
Juglans sp.	Xf subsp. unknown	A
Juniperus ashei	Xf subsp. unknown	A
Lagerstroemia indica	Xf subsp. unknown	Α
Lagerstroemia sp.	Xf subsp. unknown	A
Laurus nobilis	Xf subsp. unknown	A
Lavandula angustifolia	Xf subsp. unknown	Α
Lavandula dentata	Xf subsp. unknown	A
Lavandula latifolia	Xf subsp. unknown	A
Ligustrum lucidum	Xf subsp. unknown	A
Liquidambar styraciflua	Xf subsp. unknown	A
Lonicera japonica	Xf subsp. unknown	A
Lupinus aridorum	Xf subsp. unknown	A
Lupinus villosus	Xf subsp. unknown	A
Magnolia grandiflora	Xf subsp. unknown	A
Mallotus paniculatus	Xf subsp. unknown	A
Medicago sativa	Xf subsp. unknown	A
Mimosa sp.	Xf subsp. unknown	A
Modiola caroliniana	Xf subsp. unknown	A
Morus alba	Xf subsp. unknown	A



Plant species	Pest	Category
Morus rubra	Xf subsp. unknown	A
Morus sp.	Xf subsp. unknown	A
Myoporum insulare	Xf subsp. unknown	A
Myrtus communis	Xf subsp. unknown	A
Nandina domestica	Xf subsp. unknown	A
Neptunia lutea	Xf subsp. unknown	A
Nerium oleander	Xf subsp. unknown	A
Olea europaea	Xf subsp. unknown	A
Olea europaea subsp. sylvestris	Xf subsp. unknown	A
Olea sp.	Xf subsp. unknown	A
Parthenocissus quinquefolia	Xf subsp. unknown	A
Paspalum dilatatum	Xf subsp. unknown	A
Periwinkle (common name)	Xf subsp. unknown	A
Persea americana	Xf subsp. unknown	A
Phoenix reclinata	Xf subsp. unknown	A
Phoenix roebelenii	Xf subsp. unknown	A
Pinus taeda	Xf subsp. unknown	A
Platanus occidentalis	Xf subsp. unknown	A
Platanus sp.	Xf subsp. unknown	A
Polygala myrtifolia	Xf subsp. unknown	A
Prunus avium	Xf subsp. unknown	A
Prunus cerasifera	Xf subsp. unknown	A
Prunus cerasifera × P. munsoniana	Xf subsp. unknown	A
Prunus dulcis	Xf subsp. unknown	A
Prunus persica	Xf subsp. unknown	A
Prunus salicina	Xf subsp. unknown	A
Prunus sp.	Xf subsp. unknown	A
Pyrus pyrifolia	Xf subsp. unknown	A
<i>Pyrus</i> sp.	Xf subsp. unknown	A
Quercus coccinea	Xf subsp. unknown	A
Quercus falcata	Xf subsp. unknown	A
Quercus laevis	Xf subsp. unknown	A
Quercus laurifolia	Xf subsp. unknown	A
Quercus nigra	Xf subsp. unknown	A
Quercus palustris	Xf subsp. unknown	A
Quercus rubra	Xf subsp. unknown	Α
Quercus sp.	Xf subsp. unknown	A
Quercus velutina	Xf subsp. unknown	A
Quercus virginiana	Xf subsp. unknown	A
Ratibida columnifera	Xf subsp. unknown	A
Rhamnus alaternus	Xf subsp. unknown	A
Rhus sp.	Xf subsp. unknown	A
Rosmarinus officinalis	Xr subsp. unknown	A
Rubus hedycarpus subsp. procerus	XT subsp. unknown	A
Rubus sp.	XT subsp. unknown	A
Sambucus canadensis	XT subsp. unknown	A
Sassatras albidum	XT subsp. unknown	A
Sassarras sp.	Xr subsp. unknown	A
Setaria magna	XT subsp. unknown	A
Solidago Tistulosa	xr subsp. unknown	A



Plant species	Pest	Category		ry		
Spartium junceum	Xf subsp. unknown	Α				_
Stewartia pseudocamellia	Xf subsp. unknown	Α				
Symphyotrichum divaricatum	Xf subsp. unknown	А				
Teucrium capitatum	Xf subsp. unknown	А				
Trifolium repens	Xf subsp. unknown	Α				
Ulmus americana	Xf subsp. unknown	А				
Ulmus glabra	Xf subsp. unknown	Α				
Ulmus pumila	Xf subsp. unknown	Α				
<i>Ulmus</i> sp.	Xf subsp. unknown	Α				
Vaccinium ashei	Xf subsp. unknown	А				
Vaccinium corymbosum	Xf subsp. unknown	Α				
Vaccinium sp.	Xf subsp. unknown	Α				
Vaccinium virgatum	Xf subsp. unknown	Α				
Vinca minor	Xf subsp. unknown	Α				
Vitis californica	Xf subsp. unknown	А				
Vitis candicans	Xf subsp. unknown	Α				
Vitis labrusca	Xf subsp. unknown	Α				
Vitis labrusca × V. vinifera	Xf subsp. unknown	Α				
Vitis munsoniana	Xf subsp. unknown	Α				
Vitis muscadina	Xf subsp. unknown	Α				
Vitis rotundifolia	Xf subsp. unknown	Α				
Vitis sp.	Xf subsp. unknown	Α				
Vitis vinifera	Xf subsp. unknown	Α				
Vitis vulpina	Xf subsp. unknown	А				
Acer saccharum	Xf subsp. unknown		В			
Cyperus eragrostis	Xf subsp. unknown		В			
Hevea brasiliensis	Xf subsp. unknown		В			
Prunus domestica	Xf subsp. unknown		В			
Sorghum halepense	Xf subsp. unknown		В			
Acacia longifolia	Xf subsp. unknown			С		
Acer macrophyllum	Xf subsp. unknown			С		
Acer negundo	Xf subsp. unknown			С		
Acer platanoides	Xf subsp. unknown			С		
Acer sp.	Xf subsp. unknown			С		
Aesculus \times hybrida	Xf subsp. unknown			С		
Agathis australis	Xf subsp. unknown			С		
Agrostis gigantea	Xf subsp. unknown			С		
Alectryon excelsus	Xf subsp. unknown			С		
Alternanthera ficoidea	Xf subsp. unknown			С		
Amaranthus sp.	Xf subsp. unknown			С		
Anisantha diandra	Xf subsp. unknown			С		
Anisantha rigida	Xf subsp. unknown			С		
Arctostaphylos sp.	Xf subsp. unknown			С		
Artemisia douglasiana	Xf subsp. unknown			С		
Atriplex sp.	Xf subsp. unknown			С		
Avena fatua	Xf subsp. unknown			С		
Axonopus compressus	Xf subsp. unknown			С		
Baccharis pilularis	Xf subsp. unknown			С		
Bidens pilosa	<i>Xf</i> subsp. unknown			С		
Boerhavia diffusa	<i>Xf</i> subsp. unknown			С		
	· ·					



Plant species	Pest	Category
Borreria latifolia	Xf subsp. unknown	C
Brachiaria decumbens	Xf subsp. unknown	C
Brachiaria plantaginea	Xf subsp. unknown	C
Brachyglottis sp.	Xf subsp. unknown	C
Bromus sp.	Xf subsp. unknown	C
Broussonetia papyrifera	Xf subsp. unknown	C
Calicotome sp.	Xf subsp. unknown	C
Calicotome spinosa	Xf subsp. unknown	C
Calyptocarpus biaristatus	Xf subsp. unknown	C
Campsis radicans	Xf subsp. unknown	C
Capsella bursa-pastoris	Xf subsp. unknown	C
Carex sp.	Xf subsp. unknown	C
Celastrus orbiculatus	Xf subsp. unknown	C
Cenchrus echinatus	Xf subsp. unknown	C
Chamaesyce hirta	Xf subsp. unknown	C
Chenopodiastrum murale	Xf subsp. unknown	C
Chloris halophila	Xf subsp. unknown	C
Cistus monspeliensis	Xf subsp. unknown	C
Coffea arabica \times C. canephora	Xf subsp. unknown	С
Coffea arabica × C. eugenioides	Xf subsp. unknown	С
Coffea arabica × C. liberica var. dewevrei	Xf subsp. unknown	C
Coffea arabica × C. racemosa	Xf subsp. unknown	C
Coffea canephora	Xf subsp. unknown	C
Coffea racemosa	Xf subsp. unknown	С
Coffea eugenioides	Xf subsp. unknown	C
Coffea kapakata	Xf subsp. unknown	C
Coffea liberica var. dewevrei	Xf subsp. unknown	С
Coffea stenophylla	Xf subsp. unknown	C
Commelina benghalensis	Xf subsp. unknown	С
Commelina erecta	Xf subsp. unknown	C
Convolvulus arvensis	Xf subsp. unknown	C
Coprosma repens	Xf subsp. unknown	C
Coprosma robusta	Xf subsp. unknown	C
Cordyline australis	Xf subsp. unknown	C
Cordyline sp.	Xf subsp. unknown	C
Cornus florida	Xf subsp. unknown	С
Corokia cotoneaster	Xf subsp. unknown	C
Corokia macrocarpa	Xf subsp. unknown	С
Corokia sp.	Xf subsp. unknown	C
Corynocarpus laevigatus	Xf subsp. unknown	C
Croton setigerus	Xf subsp. unknown	С
Cynodon dactylon	Xf subsp. unknown	C
Cyperus sp.	Xf subsp. unknown	С
Cytisus scoparius	Xf subsp. unknown	C
Datura wrightii	Xf subsp. unknown	C
Digitaria horizontalis	Xf subsp. unknown	С
Digitaria insularis	Xf subsp. unknown	C
Digitaria sanguinalis	Xf subsp. unknown	С
Duranta erecta	Xf subsp. unknown	C
Dysphania ambrosioides	Xf subsp. unknown	С



Plant species	Pest	Category
Echinochloa crus-galli	Xf subsp. unknown	C
Eleusine indica	Xf subsp. unknown	C
Erigeron canadensis	Xf subsp. unknown	C
Eriochloa contracta	Xf subsp. unknown	C
Eriogonum sp.	Xf subsp. unknown	C
Erodium botrys	Xf subsp. unknown	C
Erodium moschatum	Xf subsp. unknown	C
Erodium sp.	Xf subsp. unknown	C
Escallonia bifida	Xf subsp. unknown	C
Eucalyptus sp.	Xf subsp. unknown	C
Facelis retusa	Xf subsp. unknown	C
Fragaria vesca subsp. californica	Xf subsp. unknown	C
Fraxinus angustifolia	Xf subsp. unknown	С
Fraxinus dipetala	Xf subsp. unknown	C
Fuchsia magellanica	Xf subsp. unknown	C
Genista lucida	Xf subsp. unknown	C
Geranium dissectum	Xf subsp. unknown	C
Haloragis erecta	Xf subsp. unknown	C
Hebe sp.	Xf subsp. unknown	C
Hedera helix	Xf subsp. unknown	C
Heliotropium fruticosum	Xf subsp. unknown	C
Heliotropium indicum	Xf subsp. unknown	C
Heterotheca grandiflora	Xf subsp. unknown	C
Hordeum murinum	Xf subsp. unknown	C
Hydrangea paniculata	Xf subsp. unknown	C
Hypochaeris brasiliensis	Xf subsp. unknown	C
Ipomoea fistulosa	Xf subsp. unknown	С
Juglans regia	Xf subsp. unknown	C
Lactuca serriola	Xf subsp. unknown	С
Leonurus sibiricus	Xf subsp. unknown	C
Lepidium auriculatum	Xf subsp. unknown	С
Lepidium didymum	Xf subsp. unknown	C
Ligustrum sinense	Xf subsp. unknown	C
Ligustrum virginicum	Xf subsp. unknown	C
Liriodendron tulipifera	Xf subsp. unknown	C
Lolium multiflorum	Xf subsp. unknown	C
Lolium perenne	Xf subsp. unknown	C
Ludwigia grandiflora	Xf subsp. unknown	С
Malva parviflora	Xf subsp. unknown	С
Marrubium vulgare	Xf subsp. unknown	С
Medicago polymorpha	Xf subsp. unknown	С
Melicope ternata	Xf subsp. unknown	С
Melicytus ramiflorus	Xf subsp. unknown	C
Melilotus sp.	Xf subsp. unknown	С
Melissa officinalis	Xf subsp. unknown	С
Merremia macrocalyx	Xf subsp. unknown	С
Meryta sinclairii	Xf subsp. unknown	С
Metrosideros excelsa	Xf subsp. unknown	С
Metrosideros sp.	Xf subsp. unknown	C
Metrosideros kermadecensis	Xf subsp. unknown	C



Plant species	Pest	Category
Montiastrum lineare	Xf subsp. unknown	С
Myoporum laetum	Xf subsp. unknown	C
Origanum majorana	Xf subsp. unknown	C
Panicum acuminatum	Xf subsp. unknown	C
Parthenocissus tricuspidata	Xf subsp. unknown	C
Paspalum urvillei	Xf subsp. unknown	C
Paspalum regnellii	Xf subsp. unknown	C
Passiflora foetida	Xf subsp. unknown	C
Pennisetum clandestinum	Xf subsp. unknown	С
Persicaria lapathifolia	Xf subsp. unknown	C
Persicaria maculosa	Xf subsp. unknown	C
Phalaris angusta	Xf subsp. unknown	C
Phoenix sp.	Xf subsp. unknown	С
Phormium colensoi	Xf subsp. unknown	C
Phormium tenax	Xf subsp. unknown	C
Pittosporum crassifolium	Xf subsp. unknown	C
Pittosporum eugenioides	Xf subsp. unknown	C
Pittosporum tenuifolium	Xf subsp. unknown	C
Pittosporum umbellatum	Xf subsp. unknown	С
Plantago lanceolata	Xf subsp. unknown	C
Pluchea odorata	Xf subsp. unknown	C
Poa annua	Xf subsp. unknown	C
Polygonum arenastrum	Xf subsp. unknown	C
Portulaca oleracea	Xf subsp. unknown	C
Prunus angustifolia	Xf subsp. unknown	C
Prunus laurocerasus	Xf subsp. unknown	C
Prunus serotina	Xf subsp. unknown	C
Prunus serrulata	Xf subsp. unknown	C
Prunus simonii \times P. salicina \times P. cerasifera \times P. munsoniana	Xf subsp. unknown	С
Quercus agrifolia	Xf subsp. unknown	C
Quercus alba	Xf subsp. unknown	C
Quercus ilex	Xf subsp. unknown	C
Quercus imbricaria	Xf subsp. unknown	С
Quercus incana	Xf subsp. unknown	C
Quercus macrocarpa	Xf subsp. unknown	C
Quercus phellos	Xf subsp. unknown	С
Ranunculus repens	Xf subsp. unknown	C
Rhus diversiloba	Xf subsp. unknown	C
Richardia sp.	Xf subsp. unknown	С
Rosa californica	Xf subsp. unknown	C
Rubus ursinus	Xf subsp. unknown	C
Rubus vitifolius	Xf subsp. unknown	C
Rumex crispus	Xf subsp. unknown	С
<i>Salix</i> sp.	Xf subsp. unknown	С
Salsola kali subsp. tragus	Xf subsp. unknown	С
Sambucus cerulea	Xf subsp. unknown	С
Senecio grisebachii	Xf subsp. unknown	С
Senecio vulgaris	Xf subsp. unknown	С
Senna secundiflora	Xf subsp. unknown	С
Sida rhombifolia	Xf subsp. unknown	C



Plant species	Pest	Category			
Silybum marianum	Xf subsp. unknown		С		
Sisymbrium irio	Xf subsp. unknown		С		
Solanum americanum	Xf subsp. unknown		С		
Sonchus oleraceus	Xf subsp. unknown		С		
Sonchus sp.	Xf subsp. unknown		С		
Sophora secundiflora	Xf subsp. unknown		С		
Stachys arvensis	Xf subsp. unknown		С		
Stellaria media	Xf subsp. unknown		С		
Syzygium paniculatum	Xf subsp. unknown		С		
Talinum paniculatum	Xf subsp. unknown		С		
Taraxacum officinale	Xf subsp. unknown		С		
Trifolium incarnatum	Xf subsp. unknown		С		
Urtica dioica subsp. gracilis	Xf subsp. unknown		С		
Urtica urens	Xf subsp. unknown		С		
Vaccinium elliottii	Xf subsp. unknown		С		
Verbena litoralis	Xf subsp. unknown		С		
Vernonia sp.	Xf subsp. unknown		С		
Veronica persica	Xf subsp. unknown		С		
Veronica sp.	Xf subsp. unknown		С		
Vicia Iudoviciana	Xf subsp. unknown		С		
Vinca major	Xf subsp. unknown		С		
Vitex lucens	Xf subsp. unknown		С		
Vitis arizonica	Xf subsp. unknown		С		
Vitis girdiana	Xf subsp. unknown		С		
Wisteria frutescens	Xf subsp. unknown		С		
Xanthium spinosum	Xf subsp. unknown		С		
Citrus × limonia	Xf subsp. unknown			D	
Coffea liberica	Xf subsp. unknown			D	
Prunus americana	Xf subsp. unknown			D	
Prunus munsoniana	Xf subsp. unknown			D	
Prunus simonii	Xf subsp. unknown			D	
Solidago canadensis	Xf subsp. unknown			D	
Prunus armeniaca	Xf subsp. unknown				Е
Prunus hortulana	Xf subsp. unknown				Е
Prunus mexicana	Xf subsp. unknown				Е
Ulmus × hollandica	Xf subsp. unknown				Е
Vitis aestivalis	Xf subsp. unknown				Е
Vitis bourquiniana	Xf subsp. unknown				Е
Vitis cinerea	Xf subsp. unknown				Е
Vitis simpsonii	Xf subsp. unknown				Е
Vitis × champinii	Xf subsp. unknown				Е
Vitis rufotomentosa	Xf subsp. unknown				Е
Vitis shuttleworthii	Xf subsp. unknown				Е
Plant species	Pest	Ca	ateg	ory	
Acer sp.	Xf subsp. fastidiosa	A			
Calicotome spinosa	Xf subsp. fastidiosa	Α			
Cercis occidentalis	Xf subsp. fastidiosa	Α			
Cistus monspeliensis	Xf subsp. fastidiosa	Α			
Citrus sinensis	Xf subsp. fastidiosa	Α			



Plant species	Pest	Category		ory	
Coffea arabica	Xf subsp. fastidiosa	Α			
Erysimum hybrids	Xf subsp. fastidiosa	Α			
Genista lucida	Xf subsp. fastidiosa	Α			
Juglans regia	Xf subsp. fastidiosa	Α			
Lupinus aridorum	Xf subsp. fastidiosa	Α			
Magnolia grandiflora	Xf subsp. fastidiosa	Α			
Medicago sativa	Xf subsp. fastidiosa	Α			
Metrosideros sp.	Xf subsp. fastidiosa	Α			
Morus sp.	Xf subsp. fastidiosa	Α			
Nerium oleander	Xf subsp. fastidiosa	Α			
Pluchea odorata	Xf subsp. fastidiosa	Α			
Polygala myrtifolia	Xf subsp. fastidiosa	Α			
Prunus avium	Xf subsp. fastidiosa	Α			
Prunus dulcis	Xf subsp. fastidiosa	Α			
Prunus persica	Xf subsp. fastidiosa	Α			
Prunus sp.	Xf subsp. fastidiosa	Α			
Rhamnus alaternus	Xf subsp. fastidiosa	Α			
Rosmarinus officinalis	Xf subsp. fastidiosa	А			
Rubus rigidus	Xf subsp. fastidiosa	Α			
Rubus ursinus	Xf subsp. fastidiosa	А			
Sambucus canadensis	Xf subsp. fastidiosa	Α			
Spartium junceum	Xf subsp. fastidiosa	Α			
Streptocarpus hybrids	Xf subsp. fastidiosa	Α			
Ulmus americana	Xf subsp. fastidiosa	Α			
Vinca major	Xf subsp. fastidiosa	Α			
Vitis aestivalis	Xf subsp. fastidiosa	А			
Vitis aestivalis hybrid	Xf subsp. fastidiosa	Α			
Vitis californica	Xf subsp. fastidiosa	Α			
Vitis candicans	Xf subsp. fastidiosa	Α			
Vitis cinerea var. helleri \times V. vulpina	Xf subsp. fastidiosa	Α			
, Vitis girdiana	Xf subsp. fastidiosa	Α			
Vitis rotundifolia	Xf subsp. fastidiosa	А			
Vitis sp.	Xf subsp. fastidiosa	Α			
Vitis vinifera	Xf subsp. fastidiosa	Α			
Ambrosia artemisiifolia	Xf subsp. fastidiosa		С		
Broussonetia papyrifera	Xf subsp. fastidiosa		С		
Quercus sp.	Xf subsp. fastidiosa		С		
Ulmus sp.	Xf subsp. fastidiosa		С		
Sambucus sp.	Xf subsp. fastidiosa				Е
Plant species	Pest		Catego	ory	
Coffea arabica	Xf subsp.fastidiosa/sandyi	Α		_	
Coffea canephora	Xf subsp.fastidiosa/sandyi	Α			
Plant species	Pest		Catego	ory	
Morus alba	Xf subsp. morus	Α			
Morus rubra	Xf subsp. morus	Α			
Morus sp.	Xf subsp. morus	Α			
Nandina domestica	Xf subsp. morus	Α			
Plant species	Pest		Catego	ory	
Acacia dealbata	Xf subsp. multiplex	А			



Plant species	Pest	Category
Acacia longifolia	Xf subsp. multiplex	A
Acacia saligna	Xf subsp. multiplex	A
Acacia sp.	Xf subsp. multiplex	Α
Acer griseum	Xf subsp. multiplex	A
Acer pseudoplatanus	Xf subsp. multiplex	A
Acer rubrum	Xf subsp. multiplex	A
Alnus rhombifolia	Xf subsp. multiplex	A
Ambrosia psilostachya	Xf subsp. multiplex	A
Ambrosia trifida	Xf subsp. multiplex	A
Ambrosia trifida var. texana	Xf subsp. multiplex	A
Ampelopsis cordata	Xf subsp. multiplex	A
Anthyllis hermanniae	Xf subsp. multiplex	A
Artemisia arborescens	Xf subsp. multiplex	A
Artemisia sp.	Xf subsp. multiplex	A
Asparagus acutifolius	Xf subsp. multiplex	A
Baccharis halimifolia	Xf subsp. multiplex	A
Calicotome spinosa	Xf subsp. multiplex	Α
Calicotome villosa	Xf subsp. multiplex	A
Carya illinoinensis	Xf subsp. multiplex	A
Carya sp.	Xf subsp. multiplex	A
Celtis occidentalis	Xf subsp. multiplex	A
Cercis canadensis	Xf subsp. multiplex	A
Cercis occidentalis	Xf subsp. multiplex	A
Cercis siliquastrum	Xf subsp. multiplex	A
Chionanthus sp.	Xf subsp. multiplex	A
Cistus creticus	Xf subsp. multiplex	Α
Cistus monspeliensis	Xf subsp. multiplex	A
Cistus salviifolius	Xf subsp. multiplex	A
<i>Cistus</i> sp.	Xf subsp. multiplex	A
Convolvulus cneorum	Xf subsp. multiplex	A
Coprosma repens	Xf subsp. multiplex	A
Coronilla valentina	Xf subsp. multiplex	A
Coronilla valentina subsp. glauca	Xf subsp. multiplex	A
Cytisus scoparius	Xf subsp. multiplex	A
<i>Cytisus</i> sp.	Xf subsp. multiplex	A
Cytisus spinosa	Xf subsp. multiplex	A
Cytisus villosus	Xf subsp. multiplex	A
Dodonaea viscosa	Xf subsp. multiplex	A
Elaeagnus angustifolia	Xf subsp. multiplex	A
Encelia farinosa	Xf subsp. multiplex	A
Erigeron karvinskianus	Xf subsp. multiplex	A
Euryops chrysanthemoides	Xf subsp. multiplex	A
Euryops pectinatus	Xf subsp. multiplex	A
Fallopia japonica	Xf subsp. multiplex	A
Ficus carica	Xf subsp. multiplex	A
Fraxinus americana	Xf subsp. multiplex	A
Fraxinus angustifolia	Xf subsp. multiplex	A
Fraxinus sp.	Xf subsp. multiplex	A
Genista corsica	Xf subsp. multiplex	A
Genista ephedroides	Xf subsp. multiplex	A



Plant species	Pest	Category
Genista sp.	Xf subsp. multiplex	A
Genista $ imes$ spachiana	Xf subsp. multiplex	A
Ginkgo biloba	Xf subsp. multiplex	A
Gleditsia triacanthos	Xf subsp. multiplex	A
Grevillea juniperina	Xf subsp. multiplex	A
Hebe elliptica	Xf subsp. multiplex	A
Hebe sp.	Xf subsp. multiplex	A
Helianthus annuus	Xf subsp. multiplex	A
Helianthus sp.	Xf subsp. multiplex	A
Helichrysum italicum	Xf subsp. multiplex	A
Helichrysum sp.	Xf subsp. multiplex	A
Helichrysum stoechas	Xf subsp. multiplex	A
Ilex aquifolium	Xf subsp. multiplex	A
Iva annua	Xf subsp. multiplex	A
Koelreuteria bipinnata	Xf subsp. multiplex	A
Lagerstroemia indica	Xf subsp. multiplex	A
Lagerstroemia sp.	Xf subsp. multiplex	A
Laurus nobilis	Xf subsp. multiplex	A
Lavandula angustifolia	Xf subsp. multiplex	A
Lavandula dentata	Xf subsp. multiplex	A
Lavandula sp.	Xf subsp. multiplex	A
Lavandula stoechas	Xf subsp. multiplex	A
Lavandula \times heterophylla	Xf subsp. multiplex	Α
Lavandula × intermedia	Xf subsp. multiplex	A
Liquidambar styraciflua	Xf subsp. multiplex	A
Lonicera japonica	Xf subsp. multiplex	A
Lupinus villosus	Xf subsp. multiplex	A
Medicago arborea	Xf subsp. multiplex	A
Medicago sativa	Xf subsp. multiplex	A
Metrosideros excelsa	Xf subsp. multiplex	A
Myrtus communis	Xf subsp. multiplex	A
Olea europaea	Xf subsp. multiplex	A
Olea europaea subsp. sylvestris	Xf subsp. multiplex	A
Olea sp.	Xf subsp. multiplex	A
Osteospermum ecklonis	Xf subsp. multiplex	A
Pelargonium graveolens	Xf subsp. multiplex	A
Pelargonium sp.	Xf subsp. multiplex	A
Periwinkle (common name)	Xf subsp. multiplex	A
Phagnalon saxatile	Xf subsp. multiplex	A
Phlomis fruticosa	Xf subsp. multiplex	A
Pistacia vera	Xf subsp. multiplex	A
Platanus occidentalis	Xf subsp. multiplex	A
Polygala myrtifolia	Xf subsp. multiplex	A
Polygala $ imes$ grandiflora nana	Xf subsp. multiplex	A
Prunus armeniaca	Xf subsp. multiplex	A
Prunus avium	Xf subsp. multiplex	A
Prunus cerasifera	Xf subsp. multiplex	A
Prunus cerasus	Xf subsp. multiplex	A
Prunus domestica	Xf subsp. multiplex	A
Prunus dulcis	Xf subsp. multiplex	A



Prunus persica Xf subsp. multiplex A I Prunus sp. Xf subsp. multiplex A I Quercus coccinea Xf subsp. multiplex A I Quercus facata Xf subsp. multiplex A I Quercus facata Xf subsp. multiplex A I Quercus macrocarpa Xf subsp. multiplex A I Quercus platsris Xf subsp. multiplex A I Quercus platsris Xf subsp. multiplex A I Quercus shumardii Xf subsp. multiplex A I Quercus shumardii Xf subsp. multiplex A I Quercus suber Xf subsp. multiplex A I Quercus suber Xf subsp. multiplex A I Ratida columnifera Xf subsp. multiplex A I Robia canina Xf subsp. multiplex A I Rosa canina Xf subsp. multiplex A I Robia canina Xf subsp. multiplex A I Robia canina Xf subsp. multiplex A I Robi	Plant species	Pest Categor	Category		ory	
Prunus salicina Xf subsp. multiplex A A Prunus sp. Xf subsp. multiplex A A Quercus coccinea Xf subsp. multiplex A A Quercus facata Xf subsp. multiplex A A Quercus nigra Xf subsp. multiplex A A Quercus nigra Xf subsp. multiplex A A Quercus nigra Xf subsp. multiplex A A Quercus plustris Xf subsp. multiplex A A Quercus spleads Xf subsp. multiplex A A Robinia pseudoaccia Xf subsp. multiplex A A <t< th=""><th>Prunus persica</th><th>Xf subsp. multiplex</th><th>А</th><th></th><th>ĺ</th><th></th></t<>	Prunus persica	Xf subsp. multiplex	А		ĺ	
Prunus sp. Xf subsp. multiplex A A Quercus facta Xf subsp. multiplex A A Quercus facta Xf subsp. multiplex A A Quercus facta Xf subsp. multiplex A A Quercus facita Xf subsp. multiplex A A Quercus paivsithis Xf subsp. multiplex A A Quercus philts Xf subsp. multiplex A A Quercus subsr Xf subsp. multiplex A A Quercus subar Xf subsp. multiplex A A Rahmnus alaternus Xf subsp. multiplex A A Robina pseudoacacia Xf subsp. multiplex A A Rosa sap. Xf subsp. multiplex A A Satibidia columifera Xf subsp. multiplex A A Satibidia columifera	Prunus salicina	Xf subsp. multiplex	Α			
Quercus coccinea Xf subsp. multiplex A A Quercus facata Xf subsp. multiplex A A Quercus facata Xf subsp. multiplex A A Quercus macrocarpa Xf subsp. multiplex A A Quercus nigra Xf subsp. multiplex A A Quercus phellos Xf subsp. multiplex A A Quercus robur Xf subsp. multiplex A A Quercus solura Xf subsp. multiplex A A Quercus subra Xf subsp. multiplex A A Quercus suber Xf subsp. multiplex A A Quercus suber Xf subsp. multiplex A A Ratibida columnifera Xf subsp. multiplex A A Rosa canina Xf subsp. multiplex A A Rosa sp. Xf subsp. multiplex A A Rosa sp. Xf subsp. multiplex A A Sanbulcus sp. Xf subsp. multiplex A A Sanbulcus sp. Xf subsp. multiplex A A Sanbulox sp.	Prunus sp.	Xf subsp. multiplex	A			
Quercus falcata Xf subsp. multiplex A A Quercus sacvocapa Xf subsp. multiplex A A Quercus negra Xf subsp. multiplex A A Quercus palustris Xf subsp. multiplex A A Quercus rubra Xf subsp. multiplex A A Quercus subar Xf subsp. multiplex A A Quercus suber Xf subsp. multiplex A A Ratibida columnifera Xf subsp. multiplex A A Robina pseudoacacia Xf subsp. multiplex A A Rosa canina Xf subsp. multiplex A A Rosa canina Xf subsp. multiplex A A Rubus sp. Xf subsp. multiplex A A Santolina charaecyparisus Xf subsp. multiplex A <td>Quercus coccinea</td> <td>Xf subsp. multiplex</td> <td>Α</td> <td></td> <td></td> <td></td>	Quercus coccinea	Xf subsp. multiplex	Α			
Quercus laevis Xf subsp. multiplex A A Quercus ingra Xf subsp. multiplex A A Quercus spinalization Xf subsp. multiplex A A Quercus spinalization Xf subsp. multiplex A A Quercus spinalization Xf subsp. multiplex A A Quercus subra Xf subsp. multiplex A A Ratbida columnifera Xf subsp. multiplex A A Rosa canina Xf subsp. multiplex A A Rosa sanina Xf subsp. multiplex A A Sahvia mellifera Xf subsp. multiplex A A Sambucus sp. Xf subsp. multiplex A A <	Quercus falcata	Xf subsp. multiplex	A			
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Cistus × incanusXf subsp. multiplexCCLiriodendron tulipiferaXf subsp. multiplexCCPolygala sp.Xf subsp. multiplexCCPolygala × dalmaisianaXf subsp. multiplexCCVaccinium corymbosumXf subsp. multiplexCEPlant speciesPestCategoryAcacia salignaXf subsp. naucaA	Acer platanoides	Xf subsp. multiplex		С		
Liriodendron tulipiferaXf subsp. multiplexCCPolygala sp.Xf subsp. multiplexCCPolygala × dalmaisianaXf subsp. multiplexCCVaccinium corymbosumXf subsp. multiplexCEPlant speciesPestCategoryAcacia salignaXf subsp. naucaA	Cistus × incanus	Xf subsp. multiplex		С		
Polygala sp.Xf subsp. multiplexCCPolygala × dalmaisianaXf subsp. multiplexCCVaccinium corymbosumXf subsp. multiplexCEPlant speciesPestCategoryAcacia salignaXf subsp. naucaA	Liriodendron tulipifera	Xf subsp. multiplex		С		
Polygala × dalmaisianaXf subsp. multiplexCVaccinium corymbosumXf subsp. multiplexCPlant speciesPestCategoryAcacia salignaXf subsp. paucaA	Polygala sp.	Xf subsp. multiplex		С		
Vaccinium corymbosum Xf subsp. multiplex E Plant species Pest Category Acacia saligna Xf subsp. nauca A	Polygala × dalmaisiana	Xf subsp. multiplex		С		
Plant species Pest Category Acacia saligna Xf subsp. pauca A	Vaccinium corymbosum	Xf subsp. multiplex				Е
Acacia saligna Xf subsp. pauca A	Plant species	Pest	С	atego	ory	
	Acacia saligna	<i>Xf</i> subsp. <i>pauca</i>	A			
Acacia sp. Xf subsp. pauca A	Acacia sp.	Xf subsp. pauca	Α			



Plant species	Pest	Category		ory
Amaranthus retroflexus	Xf subsp. pauca	A		
Asparagus acutifolius	Xf subsp. pauca	A		
Catharanthus roseus	Xf subsp. pauca	A		
Chamaesyce canescens	Xf subsp. pauca	А		
Chenopodium album	Xf subsp. pauca	A		
Cistus creticus	Xf subsp. pauca	А		
Citrus sinensis	Xf subsp. pauca	A		
Citrus sp.	Xf subsp. pauca	А		
Coffea arabica	Xf subsp. pauca	A		
Coffea sp.	Xf subsp. pauca	A		
Dodonaea viscosa	Xf subsp. pauca	А		
Eremophila maculata	Xf subsp. pauca	A		
Erigeron bonariensis	Xf subsp. pauca	A		
Erigeron sp.	Xf subsp. pauca	A		
Erigeron sumatrensis	Xf subsp. pauca	A		
Euphorbia terracina	Xf subsp. pauca	A		
Grevillea juniperina	Xf subsp. pauca	Α		
Hebe sp.	Xf subsp. pauca	А		
Heliotropium europaeum	Xf subsp. pauca	Α		
Hibiscus rosa-sinensis	Xf subsp. pauca	А		
Laurus nobilis	Xf subsp. pauca	A		
Lavandula angustifolia	Xf subsp. pauca	A		
Lavandula dentata	Xf subsp. pauca	А		
Lavandula stoechas	Xf subsp. pauca	A		
Myoporum insulare	Xf subsp. pauca	A		
Myrtus communis	Xf subsp. pauca	A		
Nerium oleander	Xf subsp. pauca	A		
Olea europaea	Xf subsp. pauca	A		
Olea europaea subsp. sylvestris	Xf subsp. pauca	А		
Osteospermum fruticosum	Xf subsp. pauca	A		
Pelargonium fragrans	Xf subsp. pauca	А		
Periwinkle (common name)	Xf subsp. pauca	A		
Phillyrea latifolia	Xf subsp. pauca	А		
Polygala myrtifolia	Xf subsp. pauca	А		
Prunus avium	Xf subsp. pauca	A		
Prunus domestica	Xf subsp. pauca	А		
Prunus dulcis	Xf subsp. pauca	A		
Rhamnus alaternus	Xf subsp. pauca	A		
Rosmarinus officinalis	Xf subsp. pauca	A		
Spartium junceum	Xf subsp. pauca	А		
Vinca minor	Xf subsp. pauca	A		
Westringia fruticosa	Xf subsp. pauca	A		
Westringia glabra	Xf subsp. pauca	Α		
Prunus persica	Xf subsp. pauca		С	
Quercus ilex	Xf subsp. pauca		С	
Plant species	Pest	Ca	tego	ory
Coffea sp.	Xf subsp. sandyi	Α		
Hemerocallis sp.	Xf subsp. sandyi	A		
Jacaranda mimosifolia	Xf subsp. sandyi	A		



Plant species	Pest		Category
Magnolia grandiflora	Xf subsp. sandyi	A	
Nandina domestica	Xf subsp. sandyi	Α	
Nerium oleander	Xf subsp. sandyi	Α	
Polygala myrtifolia	Xf subsp. sandyi		С
Plant species	Pest		Category
Chitalpa tashkentensis	Xf subsp. tashke	Α	
Plant species	Pest		Category
Pyrus pyrifolia	Xylella taiwanensis	A	



Appendix B – Host plant species artificially infected

List of host plant species, artificially infected, of *X. fastidiosa* subsp. unknown (i.e. not reported in the publication), subsp. *fastidiosa*, subsp. *morus*, subsp. *multiplex*, subsp. *pauca*, subsp. *sandyi* and subsp. *tashke* according to categories A, B, C, D, E (as reported in Section 2.5.2):

A. Plant species positive with at least two detection methods (among: symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture) or positive with one method (between: sequencing, culture).

B. The same as point A, but also including microscopy: plant species positive with at least two detection methods (among: microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture) or positive with one method (between: sequencing, culture).

C. Plant species positive with at least one detection method (among: symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture).

D. Plant species positive with at least one detection method including microscopy (microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture).

E. All positives plant species reported, regardless of the detection methods (positive records but without the detection method specified, symptom observations, microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing, culturing).

Plant species	Pest	Category		
Acer macrophyllum	Xf subsp. unknown	A		
Acer negundo	Xf subsp. unknown	A		
Aesculus californica	Xf subsp. unknown	A		
Alnus rhombifolia	Xf subsp. unknown	A		
Ambrosia artemisiifolia	Xf subsp. unknown	A		
Ambrosia sp.	Xf subsp. unknown	A		
Arabidopsis thaliana	Xf subsp. unknown	A		
Artemisia douglasiana	Xf subsp. unknown	A		
Baccharis pilularis	Xf subsp. unknown	A		
Baccharis salicifolia	Xf subsp. unknown	A		
Brassica nigra	Xf subsp. unknown	A		
Carya illinoinensis	Xf subsp. unknown	A		
Catharanthus roseus	Xf subsp. unknown	A		
Citrus aurantiifolia	Xf subsp. unknown	A		
Citrus clementina	Xf subsp. unknown	A		
Citrus clementina × C. sinensis	Xf subsp. unknown	A		
Citrus jambhiri	Xf subsp. unknown	A		
Citrus reshni	Xf subsp. unknown	A		
Citrus reticulata	Xf subsp. unknown	A		
Citrus sinensis	Xf subsp. unknown	A		
Citrus sp.	Xf subsp. unknown	A		
Citrus sunki	Xf subsp. unknown	A		
Citrus unshiu	Xf subsp. unknown	A		
Citrus × limonia	Xf subsp. unknown	A		
Citrus × nobilis	Xf subsp. unknown	A		
Coffea arabica	Xf subsp. unknown	A		
Coffea sp.	Xf subsp. unknown	A		
Conium maculatum	Xf subsp. unknown	A		
Coprosma repens	Xf subsp. unknown	A		



Plant species	Pest	Category			
Coriandrum sativum	Xf subsp. unknown	A			
Cyperus eragrostis	Xf subsp. unknown	A			
Echinochloa crus-galli	Xf subsp. unknown	A			
Fagopyrum esculentum	Xf subsp. unknown	A			
Fraxinus latifolia	Xf subsp. unknown	A			
Hakea petiolaris	Xf subsp. unknown	A			
Hedera helix	Xf subsp. unknown	A			
Lobularia maritima	Xf subsp. unknown	A			
Medicago sativa	Xf subsp. unknown	A			
Morus alba	Xf subsp. unknown	A			
Morus sp.	Xf subsp. unknown	A			
Nerium oleander	Xf subsp. unknown	A			
Nicotiana benthamiana	Xf subsp. unknown	A			
Nicotiana tabacum	Xf subsp. unknown	A			
Parthenocissus quinquefolia	Xf subsp. unknown	A			
Periwinkle (common name)	Xf subsp. unknown	A			
Persea americana	Xf subsp. unknown	A			
Platanus occidentalis	Xf subsp. unknown	A			
Populus fremontii	Xf subsp. unknown	A			
Prunus cerasifera	Xf subsp. unknown	A			
Prunus dulcis	Xf subsp. unknown	A			
Prunus persica	Xf subsp. unknown	A			
Prunus salicina	Xf subsp. unknown	A			
Prunus sp.	Xf subsp. unknown	A			
Pyrus pyrifolia	Xf subsp. unknown	A			
Quercus agrifolia	Xf subsp. unknown	A			
Quercus lobata	Xf subsp. unknown	A			
Quercus rubra	Xf subsp. unknown	A			
Rhus diversiloba	Xf subsp. unknown	A			
Rosa californica	Xf subsp. unknown	A			
Rubus hedycarpus subsp. procerus	Xf subsp. unknown	A			
Rubus rigidus	Xf subsp. unknown	A			
Rubus ursinus	Xf subsp. unknown	A			
Salix laevigata	Xf subsp. unknown	A			
Salix lasiolepis	Xf subsp. unknown	A			
Salvia apiana	Xf subsp. unknown	A			
Salvia mellifera	Xf subsp. unknown	A			
Sambucus canadensis	Xf subsp. unknown	A			
Sambucus sp.	Xf subsp. unknown	A			
Spartium junceum	Xf subsp. unknown	A			
Swainsona galegifolia	Xf subsp. unknown	A			
Symphoricarpos albus	Xf subsp. unknown	A			
Teline monspessulana	Xf subsp. unknown	A			
Ulmus americana	Xf subsp. unknown	A			
Umbellularia californica	Xf subsp. unknown	A			
Urtica dioica	Xf subsp. unknown	A			
Vaccinium corymbosum	Xf subsp. unknown	A			
Vaccinium sp.	Xf subsp. unknown	A			
Vicia sativa	Xf subsp. unknown	A			
Vinca major	Xf subsp. unknown	A			



Innor Xf subsp. unknown A A Vitis arizonica x V. rupestris Xf subsp. unknown A I Vitis arizonica/candicans x V. rupestris Xf subsp. unknown A I Vitis californica Xf subsp. unknown A I Vitis californica Xf subsp. unknown A I Vitis calutaces x U. vinifera Xf subsp. unknown A I Vitis truthifolia Xf subsp. unknown A I Vitis truthifolia Xf subsp. unknown A I Vitis syn Xf subsp. unknown A I Vitis synifera Xf subsp. unknown A I Vitis synifera Xf subsp. unknown B I Vitis arizonica(candicans Xf subsp. unknown B I Vitis arizonica(sandicans Xf subsp. unknown B I Vitis arizonica(sandicans Xf subsp. unknown B I Vitis arizonica(sandicans Xf subsp. unknown C I Ambrosia candicanthcarpa Xf subsp. unknown C I Ambrosia candicanthcarpa Xf subsp.	Plant species	Pest	Category			
Vitis arizonica/candicans × V. rupestrisXf subsp. unknownAAAVitis arizonica/candicans × V. rupestrisXf subsp. unknownAIVitis californicaXf subsp. unknownAIVitis californicaXf subsp. unknownAIVitis rotundifolaXf subsp. unknownAIVitis rupestrisXf subsp. unknownAIVitis siniferaXf subsp. unknownBIVitis arizonica/candicansXf subsp. unknownCIAmbrosia acanthicarpaXf subsp. unknownCIAmbrosia inflat var. texanaXf subsp. unknownCIAmbrosia inflat angliaaXf subsp. unknownCICanas sp.Xf subsp. unknownCICanna sp.Xf subsp. unknownCICanna sp.Xf subsp. unknownCICanna sp.Xf subsp. unknownCICanna sp.Xf subsp. unknownCICantra deloicea	Vinca minor	Xf subsp. unknown	Α			
Vitis arizonica/candicans × V. rupestrisXf subsp. unknownAAVitis californicaXf subsp. unknownAIVitis californicaXf subsp. unknownAIVitis cotundifoliaXf subsp. unknownAIVitis rotundifoliaXf subsp. unknownAIVitis sp.Xf subsp. unknownAIVitis winferaXf subsp. unknownBIVitis activaliaXf subsp. unknownBIVitis activalia var. smallanaXf subsp. unknownBIVitis activalia var. smallanaXf subsp. unknownBIVitis activalia var. smallanaXf subsp. unknownCIAmbrosia trifida var. texanaXf subsp. unknownCIAmbrosia trifida var. texanaXf subsp. unknownCIAmbrosia trifida var. texanaXf subsp. unknownCIAnsantha rigidaXf subsp. unknownCIIArisantha rigidaXf subsp. unknownCIIArisantha rigidaXf subsp. unknownCIIArisantha rigidaXf subsp. unknownCIIArisantha rigidaXf subsp. unknownCIIArisanta rigidaXf subsp. unkno	Vitis arizonica \times V. rupestris	Xf subsp. unknown	Α			
Vitis californica Xf subsp. unknown A I Vitis labrusca × V. vinifera Xf subsp. unknown A I Vitis rotundifolia Xf subsp. unknown A I I Vitis rotundifolia Xf subsp. unknown A I I Vitis vinifera Xf subsp. unknown B I I Vitis arizonica/candicans Xf subsp. unknown C I I Ambrosia acanthicarpa Xf subsp. unknown C I I Amsinckia dudglasina Xf subsp. unknown C I I Arena fatua Xf subsp. unknown C I I Brachiaria pla	Vitis arizonica/candicans × V. rupestris	Xf subsp. unknown	Α			
Vitis labrusca × V. viniferaXf subsp. unknownAIVitis rotundifolia × V. rupestrisXf subsp. unknownAIVitis rotundifolia × V. rupestrisXf subsp. unknownAIVitis rotundifolia × V. rupestrisXf subsp. unknownAIVitis rupestrisXf subsp. unknownAIVitis sp.Xf subsp. unknownAIVitis sp.Xf subsp. unknownBIMous rubraXf subsp. unknownBIVitis arizonica/candicansXf subsp. unknownBIVitis arizonica/candicansXf subsp. unknownBIVitis arizonica/candicansXf subsp. unknownBIVitis arizonica/candicansXf subsp. unknownCIAmbrosia acanthicarpaXf subsp. unknownCIAmbrosia acanthicarpaXf subsp. unknownCIAmbrosia acanthicarpaXf subsp. unknownCIAnsantha rigidaXf subsp. unknownCICana sp.Xf subsp. unknownCICana sp.Xf subsp. unknownCICana sp.Xf subsp. unknownCIChrus talepinaXf subsp. unknownCIChrus talepinaXf subsp. unknownCIChrus talepinaXf subsp. unknownCICana sp.Xf subsp. unknownCIChrus talepinaXf subsp. unknownCIChrus talepinaXf subsp. unknownC <td< td=""><td>Vitis californica</td><td>Xf subsp. unknown</td><td>Α</td><td></td><td></td></td<>	Vitis californica	Xf subsp. unknown	Α			
Vitis rotundifoliaXf subsp. unknownAIVitis rupestrisXf subsp. unknownAIVitis rupestrisXf subsp. unknownAIVitis sp.Xf subsp. unknownAIVitis sp.Xf subsp. unknownAIVitis rupestrisXf subsp. unknownAIVitis viniferaXf subsp. unknownBIVitis articular surpanXf subsp. unknownBIVitis articular surpan	Vitis labrusca × V. vinifera	Xf subsp. unknown	Α			
Vitis rotundifolia × V. rupestris Xf subsp. unknown A I Vitis rupestris Xf subsp. unknown A I Vitis vinifera Xf subsp. unknown A I Vitis vinifera Xf subsp. unknown A I Morus rubra Xf subsp. unknown B I Prunus domestica Xf subsp. unknown B I Vitis arizonica/candicans Xf subsp. unknown B I Vitis arizonica/candicans Xf subsp. unknown B I Vitis arizonica/candicans Xf subsp. unknown B I Ambrosia acanthicarpa Xf subsp. unknown C I Ambrosia canthicarpa Xf subsp. unknown C I Ansiantha rigida Xf subsp. unknown C I Area fatua Xf subsp. unknown C I Brachiaria plantaginea Xf subsp. unknown C I Gallistephus chinensis Xf subsp. unknown C I Gruns deliciosa × C. sinensis Xf subsp. unknown C I Gitrus deliciosa × C. sinensis Xf subsp. unknown </td <td>Vitis rotundifolia</td> <td>Xf subsp. unknown</td> <td>Α</td> <td></td> <td></td>	Vitis rotundifolia	Xf subsp. unknown	Α			
Vitis rupestris Xf subsp. unknown A A Vitis sp. Xf subsp. unknown A A Morus rubra Xf subsp. unknown B A Morus rubra Xf subsp. unknown B B Prunus domestica Xf subsp. unknown B B Vitis arizonica/candicans Xf subsp. unknown B B Vitis arizonica/candicans Xf subsp. unknown B C Ambrosia acanthicarpa Xf subsp. unknown B C Ambrosia acanthicarpa Xf subsp. unknown C C Ambrosia trifda var. texana Xf subsp. unknown C C Ansantha rigida Xf subsp. unknown C C Arean fatua Xf subsp. unknown C C Bromus sp. Xf subsp. unknown C C Canar sp. Xf subsp. unknown C C Catus deliciosa × C. sinensis Xf subsp. unknown C C Citrus dragerina Xf subsp. unknown C C Citrus dragerina Xf subsp. unknown C C	Vitis rotundifolia $ imes$ V. rupestris	Xf subsp. unknown	Α			
Vitis sp. Xf subsp. unknown A A Vitis vinifera Xf subsp. unknown B A Morus rubra Xf subsp. unknown B B Vitis antizonica/candicans Xf subsp. unknown B B Vitis arizonica/candicans Xf subsp. unknown B C Vitis arizonica/candicans Xf subsp. unknown B C Ambrosia acanthicarpa Xf subsp. unknown C C Ambrosia acinthicarpa Xf subsp. unknown C C Ansincka douglasiana Xf subsp. unknown C C Ansincka douglasiana Xf subsp. unknown C C Arena fatua Xf subsp. unknown C C Bromus sp. Xf subsp. unknown C C Callstephus chinensis Xf subsp. unknown C C Citrus deliciosa × C. sinensis Xf subsp. unknown C C Citrus deliciosa × C. sinensis Xf subsp. unknown C C Citrus angerina Xf subsp. unknown C C C Citrus tangelo Xf subsp. unknown	Vitis rupestris	Xf subsp. unknown	Α			
Vitis vinifera Xf subsp. unknown A Morus rubra Xf subsp. unknown B Prunus domestica Xf subsp. unknown B Vitis arizonica/candicans Xf subsp. unknown B Vitis arizonica/candicans Xf subsp. unknown B Vitis arizonica/candicans Xf subsp. unknown B Vitis rufotomentosa Xf subsp. unknown C Ambrosia caranthicarpa Xf subsp. unknown C Ambrosia caranthicarpa Xf subsp. unknown C Ansantha rigida Xf subsp. unknown C Arevan fatua Xf subsp. unknown C Brachiaria plantaginea Xf subsp. unknown C Branus sp. Xf subsp. unknown C Callistephus chinensis Xf subsp. unknown C Carana sp. Xf subsp. unknown C Cltrus decica Xf subsp. unknown C	Vitis sp.	Xf subsp. unknown	Α			
Morus rubra Xf subsp. unknown B Prunus domestica Xf subsp. unknown B Vitis arizonica/candicans Xf subsp. unknown B Vitis arizonica/candicans Xf subsp. unknown B Vitis arizivalis var. smalliana Xf subsp. unknown B Ambrosis trifida var. treana Xf subsp. unknown C Ambrosis trifida var. treana Xf subsp. unknown C Ambrosis trifida var. treana Xf subsp. unknown C Ansinckia douglasiana Xf subsp. unknown C Areen fatua Xf subsp. unknown C Bronus sp. Xf subsp. unknown C Callistephus chinensis Xf subsp. unknown C Carana sp. Xf subsp. unknown C Citrus delicicas ~ C. sinensis Xf subsp. unknown C Citrus delicica a C. sinensis Xf subsp. unknown C Citrus tangerina Xf subsp. unknown C Citrus tangerina Xf subsp. unknown C Citrus tangerina Xf subsp. unknown C Citrus tangelo Xf subsp. unknown C Coprosma baueri Xf subsp. unknown C Cynodon dactylon Xf subsp. unknown C Cynodon dactylon C	Vitis vinifera	<i>Xf</i> subsp. unknown	Α			
Prunus domestica Xf subsp. unknown B Vitis arizonica/candicans Xf subsp. unknown B Vitis arizonica/candicans Xf subsp. unknown B Vitis arizonica/candicans Xf subsp. unknown B Vitis rufotomentosa Xf subsp. unknown C Ambrosia acanthicarpa Xf subsp. unknown C Ambrosia trifida var. texana Xf subsp. unknown C Ansantha rigida Xf subsp. unknown C Ansantha rigida Xf subsp. unknown C Arean fatua Xf subsp. unknown C Brachiaria plantaginea Xf subsp. unknown C Bromus sp. Xf subsp. unknown C Callistephus chinensis Xf subsp. unknown C Carana sp. Xf subsp. unknown C Carana sp. Xf subsp. unknown C Citrus deliciosa × C. sinensis Xf subsp. unknown C Citrus dragerina Xf subsp. unknown C Coronada auvensu Xf subsp. unknown C	Morus rubra	<i>Xf</i> subsp. unknown	E	3		
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Vitis aestivalis var. smalliana Xf subsp. unknown B Vitis rufotomentosa Xf subsp. unknown B Ambrosis trifida var. texana Xf subsp. unknown C Amsinckia douglasiana Xf subsp. unknown C Amsinckia douglasiana Xf subsp. unknown C Ansinckia douglasiana Xf subsp. unknown C Avena fatua Xf subsp. unknown C Brachiaria plantaginea Xf subsp. unknown C Bromus sp. Xf subsp. unknown C Canna sp. Xf subsp. unknown C Carna sp. Xf subsp. unknown C Citrus deliciosa × C. sinensis Xf subsp. unknown C Citrus medica Xf subsp. unknown C Citrus medica Xf subsp. unknown C Coprosma baueri Xf subsp. unknown C Coprosma baueri Xf subsp. unknown C Cymodon dactylon Xf subsp. unknown C Qritus scoparius Xf subsp. unknown C Oprosma baueri Xf subsp. unknown C Cymodon dactylon Xf subsp. unknown C	Vitis arizonica/candicans	<i>Xf</i> subsp. unknown	E	3		
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Helianthus annuusXf subsp. unknownCHelianthus annuusXf subsp. unknownCHordeum murinumXf subsp. unknownCHordeum vulgareXf subsp. unknownCIva annuaXf subsp. unknownCLactuca serriolaXf subsp. unknownCLatturus giorraXf subsp. unknownC	Grevillea alpina	Xf subspirumknown		C C		
Hordeum murinumXf subsp. unknownCHordeum vulgareXf subsp. unknownCIva annuaXf subsp. unknownCLactuca serriolaXf subsp. unknownC	Helianthus annuus	Xf subsp. unknown		C		
Hordeum vulgareXf subsp. unknownCIva annuaXf subsp. unknownCIva annuaXf subsp. unknownCLactuca serriolaXf subsp. unknownC	Hordeum murinum	Xf subspirumknown		C C		
Iva annua Xf subsp. unknown C Lactuca serriola Xf subsp. unknown C	Hordeum vulgare	Xf suhsp. unknown		C C		
Lactuca serriola Xf subsp. unknown C Lactuca serriola Xf subsp. unknown C	Iva annua	Xf suhsn unknown		r C		
	Lactuca serriola	Xf subsp. unknown		C C		
	Lathyrus cicera	Xf subsp. unknown		C C		



Plant species	Pest	Category		
Lathyrus clymenum	Xf subsp. unknown	C		
Lathyrus sativus	Xf subsp. unknown	C		
Leptospermum laevigatum	Xf subsp. unknown	C		
Lolium multiflorum	Xf subsp. unknown	C		
Lolium temulentum	Xf subsp. unknown	C		
Lonicera japonica	Xf subsp. unknown	C		
Melilotus albus	Xf subsp. unknown	C		
Melilotus albus var. annuus	Xf subsp. unknown	C		
Melilotus indicus	Xf subsp. unknown	C		
Melilotus officinalis	Xf subsp. unknown	C		
<i>Mentha</i> sp.	Xf subsp. unknown	C		
Oenanthe sarmentosa	Xf subsp. unknown	C		
Oenothera elata	Xf subsp. unknown	C		
Olea europaea	Xf subsp. unknown	С		
Parthenocissus tricuspidata	Xf subsp. unknown	C		
Paspalum dilatatum	Xf subsp. unknown	С		
Pelargonium \times hortorum	Xf subsp. unknown	С		
Pennisetum clandestinum	Xf subsp. unknown	С		
Pennisetum glaucum	Xf subsp. unknown	C		
Persicaria maculosa	Xf subsp. unknown	С		
Phalaris minor	Xf subsp. unknown	C		
Phalaris paradoxa	Xf subsp. unknown	С		
Phleum pratense	Xf subsp. unknown	С		
Photinia arbutifolia	Xf subsp. unknown	С		
Pittosporum crassifolium	Xf subsp. unknown	C		
Platanus sp.	Xf subsp. unknown	C		
Poa annua	Xf subsp. unknown	C		
Poncirus trifoliata	Xf subsp. unknown	C		
Reseda odorata	Xf subsp. unknown	C		
Rheum rhaponticum	Xf subsp. unknown	С		
Rubus vitifolius	Xf subsp. unknown	C		
Rumex crispus	Xf subsp. unknown	С		
Sambucus cerulea	Xf subsp. unknown	С		
Sonchus asper	Xf subsp. unknown	С		
Sorghum halepense	Xf subsp. unknown	C		
Sorghum × drummondii	Xf subsp. unknown	С		
Syringa vulgaris	Xf subsp. unknown	C		
Syzyqium paniculatum	Xf subsp. unknown	С		
Trifolium fragiferum	Xf subsp. unknown	С		
Trifolium hybridum	Xf subsp. unknown	С		
Trifolium incarnatum	Xf subsp. unknown	С		
Trifolium pratense	Xf subsp. unknown	С		
Trifolium repens	Xf subsp. unknown	С		
Trifolium repens var. latum	Xf subsp. unknown	С		
Urtica dioica subsp. gracilis	Xf subsp. unknown	C		
Vicia monantha	Xf subsp. unknown	C		
Vitis acerifolia	Xf subsp. unknown	С		
Vitis aestivalis	Xf subsp. unknown	С		
Vitis arizonica	Xf subsp. unknown	C		
Vitis arizonica hybrid	Xf subsp. unknown	C		



Itts arizonica/girdiana × V. rupestris Xf subsp. unknown C C Vitis arizonica/girdiana × V. rupestris Xf subsp. unknown C C Vitis candicans Xf subsp. unknown C C Vitis candicans Xf subsp. unknown C C Vitis candicans Xf subsp. unknown C C Vitis cinerea Xf subsp. unknown C C Vitis girdiana Xf subsp. unknown C C Vitis librusca Xf subsp. unknown C C Vitis innecounii Xf subsp. unknown C C Vitis innoticola Xf subsp. unknown C C Vitis singsoniia Xf subsp. unknown C C Vitis singsonii Xf subsp. unknown C C Vitis subsp. unknown C C C Vitis subsp. unknown <td< th=""><th>Plant species</th><th>Pest</th><th colspan="5">Category</th></td<>	Plant species	Pest	Category				
Vitis arconica/girdiana × V. rupestris Xf subsp. unknown C C Vitis berlandieri Xf subsp. unknown C C Vitis candicans Xf subsp. unknown C C Vitis cinerea Xf subsp. unknown C C Vitis cinerea Xf subsp. unknown C C Vitis girdian Xf subsp. unknown C C Vitis inneccumii Xf subsp. unknown C C Vitis subsp. unknown C C <t< td=""><td>Vitis arizonica/girdiana</td><td>Xf subsp. unknown</td><td></td><td>С</td><td></td><td></td></t<>	Vitis arizonica/girdiana	Xf subsp. unknown		С			
Wits berlandieri XF subsp. unknown C Vitis canicans XF subsp. unknown C Vitis cinerea XF subsp. unknown C Vitis diana XF subsp. unknown C Vitis diana XF subsp. unknown C Vitis dianasca XF subsp. unknown C Vitis inbrusca XF subsp. unknown C Vitis inbrusca XF subsp. unknown C Vitis musoniana XF subsp. unknown C Vitis simpsonia XF subsp. unknown C Vitis setilafolia XF subsp. unknown C Vitis setilafolia XF subsp. unknown C Vitis setilationa XF subsp. unknown C Vitis setilationa XF subsp. unknown C Vitis solitiona XF subsp. unknown C Vitis solitiona XF subsp. unknown C Vitis solitiona XF subsp. unknown C Vitis solititeworthi	Vitis arizonica/girdiana × V. rupestris	Xf subsp. unknown		С			
Vitis candicansXF subsp. unknownCCVitis cinereaXF subsp. unknownCCVitis cinereaXF subsp. unknownCCVitis cinereaXF subsp. unknownCCVitis labruscaXF subsp. unknownCCVitis lineccumiiXF subsp. unknownCCVitis inneccumiiXF subsp. unknownCCVitis inneccumiiXF subsp. unknownCCVitis munsonianaXF subsp. unknownCCVitis singsoniiXF subsp. unknownCCVitis singsoniiXF subsp. unknownCCVitis singsoniiXF subsp. unknownCCVitis subsp. unknownCCVitis subsp. unknownVitis subsp. unknownCCCVitis subsp. unknownCCC	Vitis berlandieri	Xf subsp. unknown		С			
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Vitis cinerea × V berlandieriXf subsp. unknownCCVitis gintanaXf subsp. unknownCCVitis labruscaXf subsp. unknownCCVitis lincecumiiXf subsp. unknownCCVitis monitolaXf subsp. unknownCCVitis monitolaXf subsp. unknownCCVitis monoinalaXf subsp. unknownCCVitis musnoinaXf subsp. unknownCCVitis simpsoniiXf subsp. unknownCCVitis simpsoniiXf subsp. unknownCCVitis simpsoniiXf subsp. unknownCCVitis sitalicaliXf subsp. unknownCCVitis sitalianaXf subsp. unknownCCVitis biolovlothinaXf subsp. unknownCCVitis shutleworthiiXf subsp. unknownCCVitis shutleworthiiXf subsp. unknownCCVitis aslicina × P. angustifolia) × (P salicina × P. munsonian)Xf subsp. unknownCPrunus salicina × R. salicinaXf subsp. unknownCDPrunus salicina × R. salicinaXf subsp. unknownCCPrunus salicina × R. salicinaXf subsp. unknownCCPrunus salicina × R. salicinaXf subsp. unknownC <td>Vitis cinerea</td> <td>Xf subsp. unknown</td> <td></td> <td>С</td> <td></td> <td></td>	Vitis cinerea	Xf subsp. unknown		С			
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Vitis palmataXf subsp. unknownCVitis simpsoniiXf subsp. unknownCVitis tiliaefoliaXf subsp. unknownCVitis viljonaXf subsp. unknownCVitis viljonaXf subsp. unknownCVitis viljonaXf subsp. unknownCVitis sestivalis var. smalliana × V. simpsoniiXf subsp. unknownCVitis holodwothianaXf subsp. unknownCVitis nesbittianaXf subsp. unknownCVitis shuttleworthiiXf subsp. unknownCVitis angustifoliaXf subsp. unknownCPrunus alicina × P. angustifolia) × (P. salicina × P. munsoniana)Xf subsp. unknownDPrunus angustifoliaXf subsp. unknownDDPrunus angustifoliaXf subsp. unknownDDPrunus salicina × (P. salicina × P. cerasifera)Xf subsp. unknownDDPrunus salicina × (P. salicina × P. cerasifera)Xf subsp. unknownDECitroncirus webberiXf subsp. unknownEECitroncirus webberiXf subsp. unknownEEPrunus armeniacaXf subsp. unknownEEPrunus marcianaXf subsp. unknownEEPrunus marcianaXf subsp. fastidiosaAEPunus mexicana <td< td=""><td>Vitis munsoniana</td><td>Xf subsp. unknown</td><td></td><td>С</td><td></td><td></td></td<>	Vitis munsoniana	Xf subsp. unknown		С			
Vitis simpsonii Xf subsp. unknown C Vitis viliaefolia Xf subsp. unknown C Vitis eastivalis var. smalliana × V. simpsonii Xf subsp. unknown C Vitis holodwothiana Xf subsp. unknown C C Vitis shoutheworthii Xf subsp. unknown C C Vitis shuttleworthii Xf subsp. unknown C D Prunus angustifolia Xf subsp. unknown C D Prunus autum Xf subsp. unknown D D Prunus avium Xf subsp. unknown D D Prunus avium Xf subsp. unknown D D Prunus avium Xf subsp. unknown D E Cittroncirus webberi Xf subsp. unknown <td< td=""><td>Vitis palmata</td><td>Xf subsp. unknown</td><td></td><td>С</td><td></td><td></td></td<>	Vitis palmata	Xf subsp. unknown		С			
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Eriochloa gracilis Xf subsp. fastidiosa A	Frigeron canadensis	Xf subsp. fastidiosa	Α				
	Eriochloa gracilis	Xf subsp. fastidiosa	Α				



Plant species	Pest	Category				
Erodium moschatum	Xf subsp. fastidiosa	Α				
Eucalyptus camaldulensis	Xf subsp. fastidiosa	Α				
Eucalyptus globulus	Xf subsp. fastidiosa	Α				
Helianthus annuus	Xf subsp. fastidiosa	Α				
Ipomoea purpurea	Xf subsp. fastidiosa	Α				
Lactuca serriola	Xf subsp. fastidiosa	Α				
Malva parviflora	Xf subsp. fastidiosa	Α				
Medicago sativa	Xf subsp. fastidiosa	Α				
Nicotiana glauca	Xf subsp. fastidiosa	Α				
Nicotiana tabacum	Xf subsp. fastidiosa	Α				
Portulaca oleracea	Xf subsp. fastidiosa	Α				
Prunus dulcis	Xf subsp. fastidiosa	Α				
Prunus sp.	Xf subsp. fastidiosa	Α				
Rubus ursinus	Xf subsp. fastidiosa	Α				
Rumex crispus	Xf subsp. fastidiosa	Α				
Simmondsia chinensis	Xf subsp. fastidiosa	Α				
Solanum lycopersicum	Xf subsp. fastidiosa	Α				
Solanum melongena	Xf subsp. fastidiosa	Α				
Sonchus oleraceus	Xf subsp. fastidiosa	Α				
Sorghum halepense	Xf subsp. fastidiosa	Α				
Vicia faba	Xf subsp. fastidiosa	Α				
Vicia sativa	Xf subsp. fastidiosa	Α				
Vitis sp.	Xf subsp. fastidiosa	Α				
Vitis vinifera	Xf subsp. fastidiosa	Α				
Xanthium strumarium	Xf subsp. fastidiosa	Α				
Arabidopsis thaliana	Xf subsp. fastidiosa		В			
Dendranthema × grandiflorum	Xf subsp. fastidiosa			С		
Olea europaea	Xf subsp. fastidiosa			С		
Prunus dulcis × P. webbii	Xf subsp. fastidiosa			С		
Prunus persica	Xf subsp. fastidiosa			С		
Prunus persica \times P. webbii	Xf subsp. fastidiosa			С		
Prunus webbii	Xf subsp. fastidiosa			С		
Rubus rigidus	Xf subsp. fastidiosa			С		
Sambucus canadensis	Xf subsp. fastidiosa			С		
Vaccinium corymbosum	Xf subsp. fastidiosa			С		
Vinca major	Xf subsp. fastidiosa			С		
Vitis arizonica/candicans	Xf subsp. fastidiosa			С		
Vitis californica	Xf subsp. fastidiosa			С		
Liquidambar styraciflua	Xf subsp. fastidiosa					Е
Vaccinium sp.	Xf subsp. fastidiosa					E
Vitis champinii \times (V. solonis \times V. othello)	Xf subsp. fastidiosa					Е
Plant species	Pest		Ca	tego	ry	
Morus alba	Xf subsp. morus	Α			_	
Nerium oleander	Xf subsp. morus	Α				
Plant species	Pest		Category			
Acer rubrum	Xf subsp. multiplex	Α				
Ambrosia artemisiifolia	Xf subsp. multiplex	Α				
Carya illinoinensis	Xf subsp. multiplex	Α				
Liquidambar styraciflua	Xf subsp. multiplex	Α				

Plant species	Pest	Category				
Medicago sativa	Xf subsp. multiplex	Α				
Nicotiana tabacum	Xf subsp. multiplex	Α				
Olea europaea	Xf subsp. multiplex	Α				
Pistacia vera	Xf subsp. multiplex	Α				
Platanus occidentalis	Xf subsp. multiplex	Α				
Polygala myrtifolia	Xf subsp. multiplex	Α				
Prunus cerasifera	Xf subsp. multiplex	Α				
Prunus dulcis	Xf subsp. multiplex	Α				
Prunus persica	Xf subsp. multiplex	Α				
Prunus sp.	Xf subsp. multiplex	Α				
Quercus falcata	Xf subsp. multiplex	Α				
Rubus fruticosus	Xf subsp. multiplex	Α				
Rubus ursinus	Xf subsp. multiplex	Α				
Vitis vinifera	Xf subsp. multiplex	Α				
Catharanthus roseus	Xf subsp. multiplex			С		
Prunus persica \times P. webbii	Xf subsp. multiplex			С		
Prunus webbii	Xf subsp. <i>multiplex</i>			C		
Vaccinium corvmbosum	Xf subsp. <i>multiplex</i>			C		
Vaccinium sp.	Xf subsp. multiplex			-		Е
Plant species	Pest		Ca	tego	ry	
Brachiaria decumbens	Xf subsp. pauca	Α			-	
Brachiaria plantaginea	Xf subsp. pauca	Α				
Catharanthus roseus	Xf subsp. pauca	Α				
Citrus reticulata	Xf subsp. pauca	Α				
Citrus sinensis	Xf subsp. pauca	Α				
Citrus sp.	Xf subsp. pauca	Α				
Citrus × nobilis	Xf subsp. pauca	Α				
Coffea arabica	Xf subsp. pauca	Α				
Coffea sp.	Xf subsp. pauca	Α				
Echinochloa crus-galli	Xf subsp. pauca	Α				
Nerium oleander	Xf subsp. pauca	Α				
Nicotiana clevelandii	Xf subsp. pauca	Α				
Nicotiana tabacum	Xf subsp. pauca	Α				
Olea europaea	Xf subsp. pauca	Α				
Polygala myrtifolia	Xf subsp. pauca	Α				
Arabidopsis thaliana	Xf subsp. pauca		В			
Bidens pilosa	Xf subsp. pauca			С		
Chenopodium album	Xf subsp. pauca			С		
Digitaria horizontalis	Xf subsp. pauca			С		
Medicago sativa	Xf subsp. pauca			С		
Periwinkle (common name)	Xf subsp. pauca			C		
Prunus avium	Xf subsp. pauca			C		
Prunus dulcis	Xf subsp. pauca			C		
Solanum americanum	Xf subsp. pauca	-		С		
Plant species	Pest	_	Category			
Catharanthus roseus	Xf subsp. sandvi	Δ			•	
Medicado sativa	Xf subsp. sandvi	A				
Nerium oleander	Xf subspi sandvi	Δ				
Prunus dulcis	Xf subspi sandvi	Δ				
	n sabspi sanayi	17				



Plant species	Pest	Category
Vinca major	Xf subsp. sandyi	A
Nicotiana tabacum	Xf subsp. sandyi	С
Plant species	Pest	Category
Nicotiana benthamiana	Xf subsp. tashke	С



Appendix C – Host plant species infected in unspecified conditions

List of host plant species, infected in unspecified conditions, of *X. fastidiosa* subsp. unknown (i.e. not reported in the publication), subsp. *fastidiosa*, subsp. *multiplex*, subsp. *pauca* and subsp. *sandyi* according to categories A, B, C, D, E (as reported in Section 2.5.2):

A. Plant species positive with at least two detection methods (among: symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture) or positive with one method (between: sequencing, culture).

B. The same as point A, but also including microscopy: plant species positive with at least two detection methods (among: microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture) or positive with one method (between: sequencing, culture).

C. Plant species positive with at least one detection method (among: symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture).

D. Plant species positive with at least one detection method including microscopy (microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing and culture).

E. All positives plant species reported, regardless of the detection methods (positive records but without the detection method specified, symptom observations, microscopy, symptoms observation on the test plant in experimental vector transmission, ELISA, other immunological techniques, PCR-based methods, sequencing, culturing).

Plant species	Pest	Category					
Ampelopsis arborea	Xf subsp. unknown	А					
Catharanthus roseus	Xf subsp. unknown	А					
Catharanthus sp.	Xf subsp. unknown	А					
Citrus jambhiri	Xf subsp. unknown	А					
Citrus sinensis	Xf subsp. unknown	Α					
Coffea arabica	Xf subsp. unknown	А					
Hibiscus schizopetalus	Xf subsp. unknown	А					
Morus nigra	Xf subsp. unknown	А					
Nerium oleander	Xf subsp. unknown	А					
Prunus persica	Xf subsp. unknown	Α					
Prunus sp.	Xf subsp. unknown	Α					
Sambucus canadensis	Xf subsp. unknown	А					
Vitis munsoniana	Xf subsp. unknown	Α					
Vitis rotundifolia	Xf subsp. unknown	А					
<i>Vitis</i> sp.	Xf subsp. unknown	А					
Vitis vinifera	Xf subsp. unknown	А					
Ambrosia sp.	Xf subsp. unknown		В				
Periwinkle (common name)	Xf subsp. unknown		В				
Acer sp.	Xf subsp. unknown			С			
Carya illinoinensis	Xf subsp. unknown			С			
Citrus sp.	Xf subsp. unknown			С			
Prunus dulcis	Xf subsp. unknown			С			
Prunus salicina	Xf subsp. unknown			С			
<i>Pyrus</i> sp.	Xf subsp. unknown			С			
Teline monspessulana	Xf subsp. unknown			С			
Vaccinium darrowii	Xf subsp. unknown			С			
Vaccinium sp.	Xf subsp. unknown			С			
Prunus angustifolia	Xf subsp. unknown				D		
Vitis labrusca	Xf subsp. unknown				D		



Plant species	Pest			
Morus sp.	Xf subsp. unknown			E
Nicotiana tabacum	Xf subsp. unknown			E
Plant species	Pest		Category	
Ambrosia artemisiifolia	Xf subsp. fastidiosa	A		
Lupinus sp.	Xf subsp. fastidiosa	Α		
Prunus dulcis	Xf subsp. fastidiosa	Α		
Sambucus sp.	Xf subsp. fastidiosa	Α		
Vitis rotundifolia	Xf subsp. fastidiosa	Α		
<i>Vitis</i> sp.	Xf subsp. fastidiosa	Α		
Vitis vinifera	Xf subsp. fastidiosa	Α		
Plant species	Pest		Category	
Ambrosia trifida	Xf subsp. multiplex	A		
Morus sp.	Xf subsp. multiplex	Α		
Platanus sp.	Xf subsp. multiplex	Α		
Prunus cerasifera	Xf subsp. multiplex	Α		
Prunus domestica	Xf subsp. multiplex	Α		
Prunus dulcis	Xf subsp. multiplex	Α		
Prunus salicina	Xf subsp. multiplex	Α		
Quercus sp.	Xf subsp. multiplex	Α		
Rubus fruticosus	Xf subsp. multiplex	Α		
Rubus sp.	Xf subsp. multiplex	Α		
Vaccinium corymbosum	Xf subsp. multiplex	Α		
Vaccinium corymbosum \times V. angustifolium hybrid	Xf subsp. multiplex	Α		
Vinca sp.	Xf subsp. multiplex	A		
Liquidambar styraciflua	Xf subsp. multiplex		С	
Quercus laevis	Xf subsp. multiplex		С	
Quercus rubra	Xf subsp. multiplex		С	
Plant species	Pest		Category	
Citrus sinensis	Xf subsp. pauca	Α		
Citrus sp.	Xf subsp. pauca	Α		
Coffea sp.	Xf subsp. pauca	Α		
Hibiscus fragilis	Xf subsp. pauca	Α		
Hibiscus sp.	Xf subsp. pauca	Α		
Nerium oleander	Xf subsp. pauca	Α		
Prunus domestica	Xf subsp. pauca	Α		
Prunus sp.	Xf subsp. pauca	Α		
Plant species	Pest		Category	
Coffea arabica	Xf subsp. sandyi	Α		
Nerium oleander	Xf subsp. sandyi		С	



Appendix D – Xylella fastidiosa Multilocus Sequence Types

Number of records for each plant species natural, artificial and infected in unspecified conditions by different multilocus sequence types (STs). The records for natural infection are divided per country. In general, the subspecies and the STs are reported as in the publication. If the subspecies and/or the STs are inferred from another publication or obtained from personal communication of the author of the publication, a note is added in the genotyping comment column of the excel file available in Zenodo in the EFSA Knowledge Junction community (https://doi.org/10.5281/zenodo.1339343).

X. fastidiosa		Natural infection														Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
fastidiosa			22					3		14	98		137	96	9	242
ST1								3		14	85		102	95	2	199
Acer sp.											1		1			1
Amaranthus blitoides														1		1
Ambrosia acanthicarpa														2		2
Calicotome spinosa										1			1			1
Catharanthus roseus														2		2
Cercis occidentalis											1		1			1
Chenopodium quinoa														2		2
Cistus monspeliensis										1			1			1
Citrus sinensis											1		1			1
Conium maculatum														2		2
Convolvulus arvensis														1		1
Cyperus esculentus														1		1
Datura wrightii														1		1
Echinochloa crus-galli														1		1
Erigeron canadensis														1		1
Eriochloa gracilis														1		1
Erodium moschatum														2		2
Eucalyptus camaldulensis														2		2
Eucalyptus globulus														1		1
Genista lucida										1			1			1
Helianthus annuus														3		3



X. fastidiosa		Natural infection														Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Ipomoea purpurea														2		2
Juglans regia										1			1			1
Lactuca serriola														3		3
Malva parviflora														2		2
Medicago sativa											3		3	11		14
Metrosideros sp.											1		1			1
Nicotiana glauca														2		2
Olea europaea														1		1
Pluchea odorata											1		1			1
Polygala myrtifolia										2			2			2
Portulaca oleracea														1		1
Prunus avium										3	2		5			5
Prunus dulcis										1	19		20	18	1	39
Rhamnus alaternus										1			1			1
Rubus ursinus														2		2
Rumex crispus														1		1
Sambucus canadensis											2		2			2
Simmondsia chinensis														2		2
Solanum lycopersicum														1		1
Solanum melongena														1		1
Sonchus oleraceus														1		1
Sorghum halepense														1		1
Spartium junceum											1		1			1
Vicia faba														1		1
Vicia sativa														1		1
Vitis aestivalis											2		2			2
Vitis girdiana											1		1			1
Vitis sp.								2			31		33		1	34
Vitis vinifera								1		3	19		23	18		41



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Xanthium strumarium														3		3
ST2											8		8		7	15
Ambrosia artemisiifolia															1	1
Vitis rotundifolia											3		3		1	4
Vitis sp.											5		5			5
Vitis vinifera															5	5
ST3											1		1			1
Lupinus aridorum											1		1			1
ST4											4		4	1		5
Medicago sativa														1		1
<i>Vitis</i> sp.											4		4			4
ST17			1										1			1
Coffea arabica			1										1			1
ST18			1										1			1
<i>Vitis</i> sp.			1										1			1
ST19			1										1			1
Coffea arabica			1										1			1
ST20			1										1			1
Coffea arabica			1										1			1
ST21			1										1			1
Coffea arabica			1										1			1
ST33			1										1			1
Coffea arabica			1										1			1
ST47			2										2			2
Coffea arabica			1										1			1
Vitis sp.			1										1			1
ST52			1										1			1
Coffea arabica			1										1			1
ST54			1										1			1



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Coffea arabica			1										1			1
ST55			1										1			1
Coffea arabica			1										1			1
ST56			1										1			1
Coffea arabica			1										1			1
ST57			1										1			1
Coffea arabica			1										1			1
ST59			1										1			1
Vitis vinifera			1										1			1
ST60			1										1			1
Vitis vinifera			1										1			1
ST61			3										3			3
Citrus sinensis			1										1			1
Coffea arabica			2										2			2
ST72			1										1			1
Coffea arabica			1										1			1
ST76			2										2			2
Coffea arabica			2										2			2
ST77			1										1			1
Coffea arabica			1										1			1
fastidiosa/sandyi			3					1					4			4
ST72			2										2			2
Coffea arabica			2										2			2
ST75								1					1			1
Coffea canephora								1					1			1
ST76			1										1			1
Coffea arabica			1										1			1
morus											22		22			22



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
ST29											7		7			7
Morus alba											3		3			3
Morus rubra											4		4			4
ST30											5		5			5
Morus alba											4		4			4
Nandina domestica											1		1			1
ST31											6		6			6
Morus sp.											6		6			6
ST62											4		4			4
Morus alba											4		4			4
multiplex		3			81		23		15	32	163		317	43	16	376
ST6					2					13	10		25	17	1	43
Calicotome spinosa										1			1			1
Catharanthus roseus														1		1
Helichrysum italicum										1			1			1
Medicago sativa														4		4
Nicotiana tabacum														1		1
Olea europaea										1			1	1		2
Phagnalon saxatile										1			1			1
Polygala myrtifolia										1			1	1		2
Prunus armeniaca										1			1			1
Prunus cerasifera														1		1
Prunus domestica										1			1			1
Prunus dulcis										4	10		14	5	1	20
Rhamnus alaternus										1			1			1
Rosmarinus officinalis										1			1			1
Rubus ursinus														1		1
Spartium junceum					2								2			2
Vitis vinifera														2		2



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
ST6 and ST7					1								1			1
Cistus monspeliensis					1								1			1
ST6 and/or ST7					76								76			76
Acacia dealbata					1								1			1
Acer pseudoplatanus					2								2			2
Anthyllis hermanniae					1								1			1
Artemisia arborescens					2								2			2
Asparagus acutifolius					2								2			2
Calicotome villosa					1								1			1
Cercis siliquastrum					1								1			1
Cistus creticus					1								1			1
Cistus monspeliensis					2								2			2
Cistus salviifolius					2								2			2
Coronilla valentina					2								2			2
Cytisus scoparius					1								1			1
<i>Cytisus</i> sp.					2								2			2
Cytisus villosus					1								1			1
Euryops chrysanthemoide	S				1								1			1
Genista corsica					1								1			1
Genista ephedroides					2								2			2
Genista × spachiana					2								2			2
Hebe sp.					2								2			2
Helichrysum italicum					3								3			3
Lavandula angustifolia					2								2			2
Lavandula dentata					2								2			2
Lavandula sp.					3								3			3
Lavandula stoechas					2								2			2
Lavandula × heterophylla					2								2			2
Lavandula \times intermedia					3								3			3



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Medicago sativa					1								1			1
Metrosideros excelsa					2								2			2
Myrtus communis					2								2			2
Pelargonium graveolens					2								2			2
Pelargonium sp.					2								2			2
Phagnalon saxatile					1								1			1
Polygala myrtifolia					7								7			7
<i>Polygala</i> sp.					1								1			1
Prunus cerasifera					2								2			2
Prunus dulcis					1								1			1
Quercus suber					2								2			2
Rosa canina					1								1			1
Rosmarinus officinalis					2								2			2
Spartium junceum					3								3			3
Westringia fruticosa					1								1			1
ST7					1				15	2	10		28	16		44
Acacia longifolia									1				1			1
Artemisia arborescens									1				1			1
Artemisia sp.									1				1			1
Catharanthus roseus														1		1
Coprosma repens									1				1			1
Cytisus scoparius									1				1			1
Dodonaea viscosa									1				1			1
Ilex aquifolium									1				1			1
Lavandula angustifolia									1				1			1
Lavandula dentata									1				1			1
Medicago sativa														2		2
Myrtus communis									1				1			1
Nicotiana tabacum														1		1



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Olea europaea											1		1	4		5
Olea sp.											1		1			1
Polygala myrtifolia					1					1			2	1		3
Prunus cerasifera														1		1
Prunus dulcis										1	4		5	4		9
Prunus sp.											1		1			1
Quercus suber									1				1			1
Rosmarinus officinalis									1				1			1
Rubus fruticosus														1		1
Salvia mellifera											3		3			3
Ulex europaeus									1				1			1
Ulex minor									1				1			1
Vinca major									1				1			1
Vitis vinifera														1		1
ST8											9		9			9
Alnus rhombifolia											1		1			1
Carya illinoinensis											1		1			1
Platanus occidentalis											5		5			5
Quercus palustris											1		1			1
Ulmus americana											1		1			1
ST9											28		28	2		30
Quercus coccinea											2		2			2
Quercus falcata											1		1	1		2
Quercus laevis											2		2			2
Quercus nigra											1		1			1
Quercus palustris											11		11			11
Quercus phellos											1		1			1
Quercus robur											1		1			1
Quercus rubra											5		5			5



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Quercus shumardii											1		1			1
Quercus sp.											3		3			3
Rubus fruticosus														1		1
ST10											7		7			7
Prunus domestica											2		2			2
Prunus persica											3		3			3
Prunus sp.											2		2			2
ST15											3		3			3
Prunus cerasifera											3		3			3
ST22											3		3		1	4
Ambrosia psilostachya											1		1			1
Ambrosia trifida											2		2		1	3
ST23											10		10			10
Acer rubrum											1		1			1
Ambrosia trifida											2		2			2
Helianthus sp.											2		2			2
Iva annua											1		1			1
Quercus rubra											1		1			1
Ratibida columnifera											2		2			2
Solidago virgaurea											1		1			1
ST24											5		5	3		8
Cercis occidentalis											1		1			1
Liquidambar styraciflua											3		3	2		5
Prunus dulcis														1		1
Ulmus crassifolia											1		1			1
ST25											4		4			4
Encelia farinosa											4		4			4
ST26		1									12		13	4		17
Alnus rhombifolia											1		1			1



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Prunus cerasifera											2		2	1		3
Prunus domestica		1									1		2			2
Prunus dulcis														1		1
Prunus persica														1		1
Prunus sp.											8		8			8
Rubus fruticosus														1		1
ST27											6		6		2	8
Ginkgo biloba											1		1			1
Lagerstroemia sp.											1		1			1
Prunus cerasifera															1	1
Prunus dulcis											2		2		1	3
Prunus sp.											2		2			2
ST28											4		4		1	5
Ambrosia trifida											2		2		1	3
Helianthus sp.											1		1			1
Iva annua											1		1			1
ST32											2		2		1	3
Rubus fruticosus															1	1
<i>Rubus</i> sp.											2		2			2
ST34											1		1			1
Prunus cerasifera											1		1			1
ST35											1		1			1
Xanthium strumarium											1		1			1
ST36											1		1	1		2
Prunus cerasifera														1		1
Prunus sp.											1		1			1
ST37											1		1			1
Lupinus villosus											1		1			1
ST38											1		1			1



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Platanus occidentalis											1		1			1
ST39											6		6			6
Koelreuteria bipinnata											1		1			1
Liquidambar styraciflua											4		4			4
Prunus sp.											1		1			1
ST40											4		4		1	5
Prunus cerasifera											3		3		1	4
Sambucus sp.											1		1			1
ST41											3		3		2	5
Prunus domestica															1	1
Prunus salicina															1	1
Prunus sp.											1		1			1
Ulmus americana											2		2			2
ST42											8		8		3	11
Ambrosia trifida											2		2		1	3
Sapindus saponaria											1		1			1
Vaccinium ashei											2		2			2
Vaccinium corymbosum															1	1
Vaccinium corymbosum × V. angustifolium hybrid															1	1
Vaccinium sp.											3		3			3
ST43											4		4		2	6
Vaccinium corymbosum															1	1
Vaccinium corymbosum × V. angustifolium hybrid															1	1
Vaccinium sp.											4		4			4
ST44											2		2			2
Quercus palustris											1		1			1



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Quercus rubra											1		1			1
ST45											6		6			6
Acer griseum											1		1			1
Ampelopsis cordata											1		1			1
Cercis canadensis											3		3			3
Gleditsia triacanthos											1		1			1
ST46											3		3			3
Celtis occidentalis											1		1			1
Chionanthus sp.											1		1			1
Prunus armeniaca											1		1			1
ST48											1		1			1
Sapindus saponaria											1		1			1
ST49											1		1			1
Prunus sp.											1		1			1
ST50											2		2			2
Fraxinus americana											1		1			1
Fraxinus sp.											1		1			1
ST51											2		2		1	3
Periwinkle (common name)											1		1			1
Vinca sp.											1		1		1	2
ST58											1		1		1	2
Ambrosia trifida											1		1		1	2
ST63		1											1			1
Prunus domestica		1											1			1
ST67		1											1			1
Prunus domestica		1											1			1
ST79					1								1			1
Polygala myrtifolia					1								1			1



X. fastidiosa Natural infection								Artificial infection	Unspecified infection	Grand Total						
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
ST81										17			17			17
Acacia sp.										1			1			1
Ficus carica										2			2			2
Fraxinus angustifolia										1			1			1
Lavandula dentata										1			1			1
Olea europaea										2			2			2
<i>Olea europaea</i> subsp. <i>sylvestris</i>										2			2			2
Polygala myrtifolia										2			2			2
Prunus domestica										1			1			1
Prunus dulcis										2			2			2
Rhamnus alaternus										1			1			1
Rosmarinus officinalis										2			2			2
ST82											1		1			1
Vaccinium ashei											1		1			1
ST83											1		1			1
Vaccinium ashei											1		1			1
ST87							23						23			23
Calicotome spinosa							1						1			1
Cercis siliquastrum							1						1			1
Cistus monspeliensis							1						1			1
Cistus salviifolius							1						1			1
Cistus sp.							2						2			2
Cytisus scoparius							1						1			1
Elaeagnus angustifolia							1						1			1
Ficus carica							1						1			1
Helichrysum sp.							1						1			1
Lavandula angustifolia							1						1			1
Lavandula sp.							1						1			1



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Polygala myrtifolia							3						3			3
Prunus dulcis							2						2			2
Rhamnus alaternus							2						2			2
Rosmarinus officinalis							2						2			2
Spartium junceum							2						2			2
pauca	5	117	8	2	4		233			7		2	378	127	22	527
ST11		49											49	14	3	66
Catharanthus roseus														2		2
Citrus sinensis		19											19	4	3	26
Citrus sp.		29											29			29
Coffea arabica														4		4
Coffea sp.		1											1			1
Nicotiana tabacum														4		4
ST12		3											3		3	6
Citrus sinensis		2											2		2	4
Citrus sp.		1											1		1	2
ST13		8											8	42	2	52
Catharanthus roseus														6		6
Citrus reticulata														3		3
Citrus sinensis		2											2	10	2	14
Citrus sp.		6											6	21		27
Nicotiana tabacum														1		1
Periwinkle (common name)														1		1
ST14		7											7		4	11
Coffea arabica		1											1			1
Coffea sp.		6											6		2	8
Prunus domestica															1	1
Prunus sp.															1	1



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
ST16		39											39	15	1	55
Citrus sinensis														1		1
Coffea arabica		1											1	7		8
Coffea sp.		17											17		1	18
Nicotiana tabacum														6		6
Olea europaea		21											21	1		22
ST53			7		4		233					1	245	52	6	303
Acacia saligna							1						1			1
Amaranthus retroflexus							3						3			3
Asparagus acutifolius							2						2			2
Catharanthus roseus							2						2	5		7
Chamaesyce canescens							2						2			2
Chenopodium album							5						5	1		6
Cistus creticus							1						1			1
Coffea arabica			2										2			2
Coffea sp.												1	1		2	3
Dodonaea viscosa							1						1			1
Eremophila maculata							1						1			1
Erigeron bonariensis							3						3			3
Erigeron sp.							6						6			6
Erigeron sumatrensis							1						1			1
Euphorbia terracina							1						1			1
Grevillea juniperina							1						1			1
Hebe sp.							1						1			1
Heliotropium europaeum							3						3			3
Laurus nobilis							1						1			1
Lavandula angustifolia							1						1			1
Lavandula stoechas							1						1			1
Myoporum insulare							1						1			1



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
Myrtus communis							1						1			1
Nerium oleander			5				8						13	6	4	23
Nicotiana tabacum														4		4
Olea europaea					1		154						155	25		180
Osteospermum fruticosum	,						1						1			1
Pelargonium fragrans							1						1			1
Periwinkle (common							1						1			1
name)																
Phillyrea latifolia							1						1			1
Polygala myrtifolia					1		7						8	5		13
Prunus avium							8						8	2		10
Prunus dulcis							4						4	4		8
Prunus persica					1								1			1
Quercus ilex					1								1			1
Rhamnus alaternus							1						1			1
Rosmarinus officinalis							1						1			1
Spartium junceum							1						1			1
Vinca minor							1						1			1
Westringia fruticosa							4						4			4
Westringia glabra							1						1			1
ST64		1											1			1
Citrus sinensis		1											1			1
ST65		1											1	2		3
Catharanthus roseus														2		2
Citrus sinensis		1											1			1
ST66		1											1			1
Coffea arabica		1											1			1
ST68		1											1			1
Coffea arabica		1											1			1



X. fastidiosa						Natura	al infec	tion						Artificial infection	Unspecified infection	Grand Total
subspecies/sequence type	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
ST69	4												4		1	5
Citrus sinensis	3												3		1	4
Olea europaea	1												1			1
ST70		1											1	2	2	5
Catharanthus roseus														2		2
Hibiscus fragilis															1	1
Hibiscus rosa-sinensis		1											1			1
Hibiscus sp.															1	1
ST71		1											1			1
Prunus domestica		1											1			1
ST73												1	1			1
Coffea arabica												1	1			1
ST73 and ST53			1										1			1
Coffea arabica			1										1			1
ST74				2									2			2
Coffea arabica				2									2			2
ST78	1												1			1
Prunus dulcis	1												1			1
ST80										7			7			7
Acacia sp.										1			1			1
Lavandula dentata										1			1			1
Olea europaea										1			1			1
<i>Olea europaea</i> subsp. <i>sylvestris</i>										1			1			1
Polygala myrtifolia										1			1			1
Prunus dulcis										1			1			1
Rosmarinus officinalis										1			1			1
ST84		3											3			3
Olea europaea		3											3			3



X. fastidiosa subspecies/sequence type			Artificial infection	Unspecified infection	Grand Total											
	Argentina	Brazil	Costa Rica	Ecuador	France	Honduras	Italy	Mexico	Portugal	Spain	USA	unknown	Total	Total	Total	
ST85		1											1			1
Olea europaea		1											1			1
ST86		1											1			1
Olea europaea		1											1			1
sandyi			1		1	1					23		26	4	1	31
ST5											23		23	4		27
Hemerocallis sp.											1		1			1
Jacaranda mimosifolia											1		1			1
Magnolia grandiflora											1		1			1
Nerium oleander											20		20	1		21
Prunus dulcis														1		1
Vinca major														2		2
ST72						1							1		1	2
Coffea arabica															1	1
Coffea sp.						1							1			1
ST76			1		1								2			2
Coffea sp.			1										1			1
Polygala myrtifolia					1								1			1
Grand Total	5	120	34	2	86	1	256	4	15	53	306	2	884	270	48	1,202