NAPPO
North American Plant Protection Organization
Organización Norteamericana de Protección a las Plantas

NAPPO Regional Standards for Phytosanitary Measures (RSPM)

RSPM 35
Guidelines for the Movement of Propagative Plant Material of Stone Fruit, Pome Fruit, and Grapevine into a NAPPO Member Country

The Secretariat of the North American Plant Protection Organization
1730 Varsity Drive, Suite 145
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United States of America
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Review

NAPPO Regional Standards for Phytosanitary Measures (RSPMs) are subject to periodic review and amendment. This standard was last reviewed in 2022. A review of a NAPPO standard may be initiated at any time upon request of a NAPPO member country. The next review of RSPM 35 is scheduled for 2026.

Approval

This Standard was approved by the North American Plant Protection Organization (NAPPO) Executive Committee on March 9, 2022 and is effective from this date.

Virtual approval of NAPPO Products

Given the current travel restrictions brought about by the COVID-19 pandemic, the NAPPO Management Team unanimously endorsed a temporary process for virtual approval of its products.

Beginning in January 2021 and until further notice, this statement will be included with each approved NAPPO product in lieu of the Executive Committee original signature page.

Regional standard for phytosanitary measures 35 – ***Guidelines for the Movement of Propagative Plant Material of Stone Fruit, Pome Fruit, and Grapevine into a NAPPO Member Country*** – was approved by the North American Plant Protection Organization (NAPPO) Executive Committee – see approval dates below each signature - and is effective from the latest date below.

Approved by:

NAPPO Executive Committee members for Canada (Greg Wolff, CFIA) on March 8, 2022, the United States (Ibrahim M. Shaqir, APHIS PPQ) on March 08, 2022, and Mexico (Francisco Ramírez y Ramírez, SENASICA-DGSV) on March 9, 2022. Electronic copies of approval emails from each Executive Committee member have been archived by the NAPPO Secretariat.

Stephanie Bloem

Stephanie Bloem
NAPPO Executive Director

Implementation

No implementation plans required.

Amendment Record

Amendments to this Standard will be dated and filed with the NAPPO Secretariat.

Distribution

This standard is distributed by the NAPPO Secretariat to the Industry Advisory Group (IAG), the International Plant Protection Convention (IPPC) Secretariat, and to other Regional Plant Protection Organizations (RPPOs).

INTRODUCTION

Scope

This standard describes guidelines for the importation of propagative plant material of stone fruit, pome fruit and grapevine into NAPPO member countries, and the movement of this material among these countries. Propagative plant material is defined as plants or plant parts for planting or multiplication (RSPM 5 (*NAPPO Glossary of phytosanitary terms*)). For the scope of this standard, propagative plant material includes grafted plants, rooted plants, cuttings, budwood/scion, rootstocks, tissue culture (*in vitro*) and, where applicable, seeds. The pests specifically dealt with in this standard are bacteria, phytoplasmas, viruses, and virus-like agents and, where applicable, arthropods, fungi, and nematodes. These pests include those that pose a direct risk to their host, as well as those which act as potential vectors of a secondary pest. This standard does not address abiotic disorders, varietal trueness-to-type, quality grades and standards, or soil or fruit associated with the material.

References

Good plant protection practic*e* – EPPO PP 2/1(2), 2003.
Good plant protection practice – Grapevine EPPO PP 2/23(1), 2002.
Good plant protection practice – Pome fruits EPPO PP 2/18(1),1999.
Good plant protection practice – Stone fruits EPPO PP 2/33(1), 2004.
Jelkmann, W. 2004. *International Working Group on Fruit Tree Viruses: Detection of virus and virus-like diseases of fruit trees.* Acta Horticulturae 657:575-596.
Thompson, D.A. 1998. The Role of NAPPO in Fruit Crop Virus-Testing and Certification. Acta Horticulturae 472:100.
ISPM 2. 2016. *Framework for pest risk analysis.* Rome, IPPC, FAO.
ISPM 4. 2017. *Requirements for the establishment of pest free areas*. Rome, IPPC, FAO.
ISPM 5. 2021. *Glossary of phytosanitary terms.* Rome, IPPC, FAO.
ISPM 6. 2018. *Surveillance.* Rome, IPPC, FAO.
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ISPM 8. 2021. *Determination of pest status in an area.* Rome, IPPC, FAO.
ISPM 10. 2016. *Requirements for the establishment of pest free places of production and pest free production sites.* Rome, IPPC, FAO.
ISPM 11. 2017. *Pest risk analysis for quarantine pests.* Rome, IPPC, FAO.
ISPM 12. 2017. *Phytosanitary certificates.* Rome, IPPC, FAO.
ISPM 14. 2017. *The use of integrated measures in a systems approach for pest risk management.* Rome, IPPC, FAO**.**
ISPM 29. 2017. *Recognition of pest free areas and areas of low pest prevalence.* Rome, IPPC, FAO.
ISPM 36. 2012. *Integrated measures for plants for planting*. Rome, IPPC, FAO.
RSPM 3. 2017. *Requirements for importation of potatoes into a NAPPO member country* on hold. Raleigh, NC, USA.
RSPM 5. 2021. *NAPPO glossary of phytosanitary terms.* Raleigh, NC, USA. NAPPO*.*
RSPM 9. 2021. *Authorization of laboratories for phytosanitary testing.* Raleigh, NC, USA. NAPPO.
RSPM 19. 2012. *Guidelines for bilateral workplans.* Raleigh, NC, USA. NAPPO.
RSPM 24. 2013 *Integrated pest risk management measures for the importation of plants for planting into NAPPO member countries.* Raleigh, NC, USA. NAPPO.

Definitions

Definitions of phytosanitary terms used in this standard can be found in RSPM 5 (NAPPO *glossary of phytosanitary terms)* and in ISPM 5 (*Glossary of phytosanitary terms).*

Stone fruits: Species belonging to the genus *Prunus*, including all its varieties, cultivars, and hybrids.

Pome fruits: Species belonging to the genera of *Malus*, *Pyrus*, *Cydonia*, and *Chaenomeles*, including all their varieties, cultivars, and hybrids.

Grapevines: Species of the genus *Vitis*, including all varieties, cultivars, and hybrids,

SPFTG: propagative plant material of **S**tone and **P**ome **F**ruit **T**rees and **G**rapevines.

Outline of Requirements

This standard outlines a systems approach for mitigating the risk of pest introductions associated with the international movement of SPFTG, without undue restriction of trade. A systems approach is achieved through a combination of phytosanitary measures, two or more of which act independently of each other, to prevent the entry, establishment and spread of associated pests. Section 1 (General Requirements) of this standard addresses the pest risk assessment and phytosanitary measures for pest risk management. Section 2 (Specific Requirements) identifies and describes the components of a SPFTG certification program primarily designed to control phytoplasmas, viruses, and virus-like agents spread by infected propagative material. Certification programs may also be applicable to other types of pests.

Background

This standard deals specifically with bacteria, phytoplasmas, viruses, and virus-like agents and, where applicable, arthropods, fungi, and nematodes of SPFTG. Economic impacts of these pests on commodities covered by this standard include delayed maturity; increased agricultural inputs; reduced growth, yield, and fruit quality; graft incompatibility; plant mortality; as well as potential impacts on trade. The pests addressed in this standard may also affect other commodities or natural ecosystems, with varying economic impacts. In addition to direct effects on the plants, certain nematodes and arthropods are vectors of SPFTG diseases. SPFTG including cuttings, rootstocks, and tissue cultures pose a high risk for introducing pests. Traditional phytosanitary measures used to reduce the risk of pest introduction include prohibition, quarantine restrictions, entry point inspections, appropriate treatment and therapies, and post-entry quarantines. Competitiveness of these commodities in the worldwide market requires development and exchange of new varieties and germplasm. The increased volume of trade in SPFTG now occurring between and within countries has increased the risk of pest introduction and spread.

Systems approaches for pest risk management should be developed in accordance with ISPM 14 (*The use of integrated measures in a systems approach for pest risk management)*, RSPM 24 (*Integrated pest risk management measures for the importation of plants for planting into NAPPO member countries)* and ISPM 36 *(Integrated measures for plants for planting).*

Systems approaches can provide alternatives to the application of single-point mitigations such as phytosanitary treatments or more restrictive measures such as prohibition. Systems approaches provide the opportunity to consider both pre-harvest and post-harvest procedures and measures that may contribute to the effective management of pest risk.

A systems approach requires two or more measures that are independent of each other and may also include any number of measures that are dependent on each other. An advantage of a systems approach is its ability to address variability and uncertainty in the system by modifying the number and strength of phytosanitary measures to meet the appropriate level of phytosanitary protection.

Certification programs used to control virus diseases are good examples of a systems approach at work. Various independent measures such as virus-testing, field inspection, isolation distances, and vector control all work together to minimize the introduction and spread of pests.

The objectives of this standard are to:

- prevent the entry, establishment, and spread of quarantine pests into NAPPO member countries
- mitigate the impact of regulated non-quarantine pests within NAPPO member countries
- facilitate trade into and within the NAPPO region
- promote the use of systems approaches and good plant protection practices as the basis for the development of certification programs for international exchange of SPFTG.

1. General Requirements

1.1 Stone and Pome Fruit and Grapevine Pests

A comprehensive list of pests associated with SPFTG along with their phytosanitary status in each NAPPO member country can be found in Annexes 1 and 2. While not all these pests are regulated by NAPPO member countries, they may be considered as pests of concern to SPFTG production. These pest lists are useful references for the targeted testing, therapy, and transfer of clean germplasm among NAPPO countries.

1.2 Pest Risk Analysis

All Pest Risk Analyses (PRAs) should be performed in accordance with ISPM 2 (*Framework for pest risk analysis)* and ISPM 11 (*Pest risk analysis for quarantine pests)*. Application of phytosanitary measures should be based on the results of a PRA. The pests in Annexes 1 and 2 may be classified as regulated pests, depending on their presence or absence and their official status in each country.

1.3 Phytosanitary Measures for Pest Risk Management

Phytosanitary measures for pest risk management should be used to prevent the entry, establishment, and spread of quarantine pests and mitigate the economic impact of regulated non-quarantine pests.

The importation and movement of SPFTG is subject to the application of integrated measures in a systems approach in accordance with ISPM 14 (*The use of integrated measures in a systems approach for pest risk management)*.

Following a PRA, phytosanitary measures to mitigate the risks associated with importing propagative plant material into a NAPPO member country are identified. The phytosanitary measures described below may be combined to reach the appropriate level of phytosanitary protection of the importing country. For the purposes of this standard “small quantities” of plant material are considered to be 100 plants or less, but the definition of “small quantities” will ultimately be left to the discretion of the National Plant Protection Organizations (NPPOs).

Phytosanitary measures and procedures such as inspection, fumigation, chemical sprays, hot water dips, biological control, cold treatment, and others, may be applied to plant material, growing media, or packaging. Section 3.0 “Post-entry Quarantine” identifies the criteria appropriate for the post-entry quarantine of these plants.

Appropriate phytosanitary measures for pest risk management may also depend on the end use of the material. The various categories of use of SPFTG are outlined below:

1.3.1 Research Purposes and Subsequent Destruction

This option is appropriate for SPFTG that do not necessarily come from an official certification program or that may be infested with pests. Plants are maintained under quarantine conditions authorized by the NPPO to prevent the establishment and spread of regulated pests. Plant material may be inspected, tested, or treated for pests of concern before importation or after entry, at the discretion of the NPPO. Plant material, growing media, or packaging must be disposed of as instructed by the NPPO. This option is only suitable for small quantities of plant material.

1.3.2 Quarantine, Testing and Treatment at NPPO-authorized Facilities and Subsequent Distribution

This option is appropriate for SPFTG that do not come from an official certification program or that may be infested with pests. Plants are imported for quarantine, testing and treatment in a post-entry quarantine station approved by the NPPO of the importing country. Detected regulated pests should be eliminated from the plants before their release from quarantine conditions. This option is only suitable for small quantities of plant material.

1.3.3 Quarantine at Importers’ Premises and Subsequent Distribution

This option is appropriate for SPFTG that do not come from an official certification program recognized by the NPPO of the importing country. Plants are planted under quarantine conditions on the importer’s premises, as required by the NPPO. The NPPO or authorized entity should test and/or visually examine or treat, as appropriate, for regulated pests before release from the quarantine conditions. This option may only be suitable for small quantities of plant material, at the discretion of the NPPO.

1.3.4 Plants originating from an Official Certification Program

SPFTG may be imported into a NAPPO member country if produced under an official certification program that has been evaluated using this standard and authorized by the NPPO of the importing country. The NPPO of the importing country may perform inspections either in the country of origin or on imported plants, including testing samples for the presence of pests. The NPPO of the importing country may require post-entry quarantine conditions.

1.3.5 Plants originating from a Pest-free Area, Pest Free Place of Production, or Pest Free Production Site

This option is usually not appropriate for pests such as viruses, viroids, and bacteria, where inspection is inadequate and comprehensive sampling and monitoring are impractical for determining pest-free status. SPFTG may be certified free from specific pests for entry into NAPPO member countries based on absence of these pests in the exporting site or area as outlined in ISPM 4 (*Requirements for the establishment of pest free areas)*, ISPM 10 (*Requirements for establishment of pest-free places of production and pest-free production sites),* and ISPM 29 (*Recognition of pest-free areas and areas of low pest prevalence)*. The NPPO of the importing country may perform inspections and may take samples to test for the presence of pests. The NPPO of the importing country may require post-entry quarantine conditions.

1.3.6 Prohibition

If no satisfactory phytosanitary measure to reduce risk to an acceptable level can be found, the final option may be to prohibit importation of SPFTG.

1.4 Documentation Requirements

A phytosanitary certificate or an equivalent official document should be issued by the exporting country according to the requirements of the NPPO of the importing country. A permit to import must be obtained by the importer, if required by their NPPO.

2. SPECIFIC REQUIREMENTS

2.1 Stone and Pome Fruit and Grapevine Certification Programs

This standard outlines the essential elements of a certification program to mitigate the risk of introduction and spread of SPFTG pests listed in the Annexes.

The certification program should be carried out by the NPPO, or an entity authorized by the NPPO. The certification program should clearly define phytosanitary requirements such as terminology, testing, eligibility, the nomenclature of generation levels, agricultural management, isolation and sanitation requirements, inspection and re-testing, documentation and reporting, identification and labeling, quality controls and monitoring, non-compliance and remedial measures, and criteria for post-entry quarantine.

2.1.1 Program Administration

The certification program should be administered by an NPPO, or an entity recognized by an NPPO to administer certification programs (herein referred to as an “authorized entity”).

The program should clearly and comprehensively specify the roles and responsibilities of the NPPO, the program participants, any authorized entities (e.g., laboratories involved in testing), and any organizations involved in certification activities.

The NPPO and any authorized entities should ensure that all administration, inspection, certification, and laboratory personnel meet appropriate training, experience, educational and proficiency requirements. Authorized entities should be prepared to supply, upon request, this information to their NPPO.

Authorized entities should notify their NPPO prior to making changes to the certification program or deviating from program requirements, and before plants produced under such modifications are exported.

The exporting country's NPPO or authorized entity must inform the importing country's NPPO of changes to the certification program or diagnostics before plants produced under the modified program are exported.

2.1.2 Terminology

The certification program should define all terminology specific to the certification program using sufficient detail to ensure clear understanding of the certification requirements. The terminology used by NAPPO member countries for similar purposes should be harmonized to the greatest extent possible.

2.1.3 Diagnostics

Diagnostics for pests in this standard include but are not limited to:

- sample processing for recovery or isolation and identification
- identification utilizing morphological characteristics
- determinations utilizing indicator plants
- serological tests such as Enzyme Linked Immuno-Sorbent Assays (ELISA) and,
- assays based on nucleic acid amplification by various Polymerase Chain Reaction (PCR) methodologies.

Determinations based on High Throughput Sequencing (HTS) methodologies may also be considered but should follow the recommendations outlined in CPM-14; 2019 Recommendation R-08 (*Preparing to use high-throughput sequencing (HTS) technologies as a diagnostic tool for phytosanitary purposes*).

Two or more of the aforementioned types should be considered for a more accurate diagnosis.

The NPPO or authorized entity will deliver diagnostic services. If laboratories are used, they should be authorized by the NPPO in accordance with RSPM 9 (*Authorization of laboratories for phytosanitary testing)*.

Upon request, the NPPO or authorized entity of the exporting country must provide the NPPO of the importing country with the diagnostic results, methodology and a list of pests regulated in the certification program in the exporting country.

The NPPO or authorized entity of the exporting country must notify the NPPO of the importing country of proposed changes to diagnostics being used by the NPPO or authorized entity in the exporting country. Such changes must be communicated and approved by the NPPO or authorized entity of the importing country before plants produced under the modified program are exported.

2.1.4 *Eligibility*

Potential certification program participants should file an application with their NPPO or authorized entity. Eligibility is conferred by the NPPO or authorized entity if the conditions of the certification program have been met.

The certification program should specify eligibility for plant material used in the program. Eligibility requirements also must be met when plants are purchased for export. Plant brokers must ensure the traceability of exported consignments to approved places of production.

2.1.5 *Generation Levels*

Generation levels represent successive generations of propagation from the original tested material and as such, act as a measure of the phytosanitary risk associated with plants in a certification program. Additional phytosanitary measures may be applied depending on the generation.. The certification program should clearly define generation levels. Eligibility criteria should be established at each level, including nomenclature, propagation and pest management measures, and the number of generations removed from the original tested material. It is strongly recommended that the levels within a certification program be identified as Generation 1, 2, 3, 4, etc.

2.1.6 *Agricultural Management*

The certification program should define agricultural management requirements for hosts of pests or pest vectors within the field and buffer zones.

All stone and pome fruit trees and grapevines in the certification program should be kept in good horticultural condition by following good agricultural practices for their region. Good agricultural practices are explained in the Food and Agriculture Organization (FAO) website at http://www.fao.org/3/a-i6677e.pdf.

Where they exist, it is recommended to employ best management practices, for example:

- principles of good plant protection practice – EPPO PP 2/1(2), 2003
- good plant protection practice – Grapevine EPPO PP 2/23(1), 2002
- good plant protection practice – Pome fruits EPPO PP 2/18(1), 1999 and,
- good plant protection practice – Stone fruits EPPO PP 2/33(1), 2004.

2.1.7 *Phytosanitary Risk Management*

The isolation and containment requirements of the certification program will vary according to the generation level of the propagative plant material and should be based on the epidemiology and biology of the pests and their vectors present in the certification area. The certification program should specify the minimum distance from non-certified hosts, and acceptable cover crops and weed control measures required to reduce alternate pest hosts to acceptable levels.

The certification program should specify pest management measures including vector suppression and the control of pollen-borne viruses required to adequately protect plants produced under the program from exposure to pests.

The certification program should specify the measures to mitigate the risks associated with the movement of soil or water, other growing media or plant products potentially infested with vectors or pests to acceptable levels.

The certification program should specify crop rotation and fallow requirements between host crops, and chemical control requirements for a site being used to produce plants under the certification program.

2.1.8 Inspection and Diagnostics

The certification program should specify the inspection and diagnostics requirements throughout all levels of the program.

Plants in the certification program should be inspected during the growing season at times appropriate for detecting disease symptoms and determining the presence of insects or other pest vectors using appropriate methods.

The certification program should specify:

- procedures to be undertaken upon suspicion of pest infestation
- procedures to be undertaken upon confirmation of pest infestation
- notification and inspection requirements when selling or purchasing certified material
- sampling procedures and diagnostics for pests at each generation level
- the diagnostic methodology(ies) to be used, and
- inspection requirements including review of maps of places of production and production sites, variety labelling practices, approval of new places of production and production sites, and any deviations between inventory, sales, and purchases.

2.1.9 Documentation and Identification

The NPPO or authorized entity must document all inspection, certification, and diagnostic activities to ensure the eligibility of the program participants, their places of production and production sites, and the plants produced under this certification program. These documents must be available, upon request, to the NPPOs of the importing and exporting country for audit, traceback, trace forward and other regulatory purposes.

The certification program should include a system approved by the NPPO or authorized entity to document and identify plants during growth, post-harvest, and at sale to ensure traceability. The system should at least record the generation level, the year of propagation, the program participant, geographic location of the production field, location of certified plants within the production field, the variety and rootstock, and the purchaser's identity.

Purchases and sales of plants produced under the certification program, previous cropping history for production sites, and production site maps should be retained by the program participants for a period specified by their NPPO or authorized entity.

2.1.10 Quality Assurance and Program Review

The NPPO or authorized entity of the exporting country should ensure the validity and reliability of their certification program through periodic program audits and reviews. Records and any other supporting documentation must be maintained for any such audits or reviews. In addition, the place of production should adhere to the program's quality management requirements as indicated by the NPPO or authorized entity. Fundamental changes to program delivery or deviations on agreed-upon phytosanitary measures must be communicated in advance and approved by the NPPO of the importing country.

The NPPO of the importing country should review and/or audit the certification program of the exporting country to ensure it continues to meet the certification standards and their import requirements. This may be done on a periodic basis, or in response to certification program or pest status changes, or because of evidence of non-compliance. It should include testing of imported plant material, site visits and/or review of the entire export certification program. Detection of pests or vectors controlled under the program or deficiencies in documentation may indicate that the integrity of the export certification program is compromised.

2.1.11 Non-compliance and Corrective Measures

The certification program should specify the consequences of non-compliance. In addition, the corrective measures should be specified to enable a suspended or de-certified program participant, production area or variety to become eligible for re-certification or reinstatement.

3. Post-entry Quarantine

The NPPO or authorized entity of the importing country may require post-entry quarantine for imported SPFTG. Post-entry quarantine may take place at an NPPO-approved facility and should follow the guidelines outlined in ISPM 34 (*Design and operation of post-entry quarantine stations for plants)*. The post-entry requirements should be based on the level of risk determined by the biology of the pests of concern, including their host range, their means of natural spread, and the likelihood of transmission by local vectors.

Post-entry quarantine criteria should specify:

- the roles and responsibilities of the NPPO of the importing country, authorized entities, and the importer
- agricultural practices to promote plant growth and the detection of pests
- isolation and suppression measures to control pest vectors and prevent the movement of pests within and outside the post-entry quarantine area
- measures within the post-entry quarantine area to reduce alternate hosts and pest vectors, such as weed control and buffer zones
- soil and plant treatment, vector surveillance and suppression, facility design and other criteria to be met before a facility, production site, or production area becomes suitable for post-entry quarantine
- the requirements for movement and sanitation of agricultural equipment and personnel into and from the post-entry quarantine area
- containment, security, and access restrictions to the imported plants
- handling and disposal of pruning waste and all other articles capable of harboring or spreading pests
- inspection, sampling, and diagnostics to determine the presence of pests in the imported plants
- conditions under which the imported plants would be moved, removed, or released from post-entry quarantine, and

- sanitation and subsequent use restrictions of a post-entry quarantine area.

4. Evaluation and Approval of a Certification Program

Prior to allowing importation of SPFTG, the NPPO of the importing country should evaluate the certification program of the exporting country, including a documentation review, a site visit, and/or testing of plants by the NPPO of the importing country to ensure they meet the certification program standards.

Following approval of the certification program additional temporary restrictions such as pre-clearance testing, and post-entry quarantine may be used.

5. Bilateral Workplans

The NPPOs of the exporting and importing countries may decide that a bilateral workplan is necessary to elaborate on these guidelines. Guidelines for the development of bilateral workplans are provided in RSPM 19 (*Guidelines for Bilateral Workplans)*. Modifications to these guidelines should be technically justified.

Annex 1: Stone and Pome Fruit Tree Pests

Note: Synonyms for virus names in Tables 1 and 2 can be found in Appendix 2 of RSPM 25 archived in the NAPPO website.

LEGEND FOR SYMBOLS USED IN TABLES

Presence or absence unless otherwise noted conform to the categories listed in ISPM 8: 2021 (*Determination of pest status in an area)*. For ease of reference, alphanumeric designations have been added here.

Ab1: Absent: pest not recorded
Ab2: Absent: the entire country is pest-free
Ab3: Absent: pest records invalid
Ab4: Absent: pest no longer present
Ab5: Absent: pest eradicated

P1: Present: widely distributed
P2: Present: not widely distributed and not under official control
P3: Present: not widely distributed and under official control
P4: Present: at low prevalence
P5: Present: except in specified pest-free areas
P6: Present: transient
P7: Present: not associated with host (NAPPO category)

Table 1: Virus pests of stone fruit
Table 2: Virus pests of pome fruit
Table 3: Fungal pathogens (incl. Chromista) of stone and pome fruit trees
Table 4. Bacterial pathogens of stone and pome fruit trees
Table 5: Nematode pests of stone and pome fruit trees

Table 1: Virus pests of stone fruit.

Last updated December 2021.

PEST	ABBREVIATION	FAMILY	GENUS	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
						CAN	USA	MEX
Amasya cherry disease associated virus	ACDaV	*Chrysoviridae*	*Chrysovirus*	*P. avium*	Covelli *et al*., 2004	Ab1	Ab1	Ab1
American plum line pattern virus	APLPV	*Bromoviridae*	*Ilarvirus*	*P. avium, P. domestica, P. persica, P. salicina*	Hadidi *et al*., 2011	P2	P2	Ab1
Apple chlorotic leaf spot virus	ACLSV	*Betaflexiviridae*	*Trichovirus*	*Prunus* spp.	Hadidi *et al*., 2011	P2	P2	Ab1
Apple mosaic virus	ApMV	*Bromoviridae*	*Ilarvirus*	*Prunus* spp.	Hadidi *et al*., 2011	P7	P2	Ab3
Apricot latent ringspot virus	ALRSV	*Secoviridae*	*Nepovirus*	*P. armeniaca, P. avium, P. domestica, P. persica*	Gentit *et al*., 2001	Ab1	Ab1	Ab1
Apricot latent virus	ApLV	*Betaflexiviridae*	*Foveavirus*	*P. armeniaca, P. avium, P. domestica, P. salicina, P. persica*	Grimová and Rysanek, 2012	Ab1	Ab1	Ab1
Apricot pseudo-chlorotic leaf spot virus	APCLSV	*Betaflexiviridae*	*Trichovirus*	*P. armeniaca, P. avium, P. domestica, P. persica, P. salicina*	Hadidi *et al*., 2011	Ab1	Ab1	Ab1
Apple scar skin viroid	ASSVd	*Pospiviroidae*	*Apscaviroid*	*P. armeniaca, P. avium, P. persica*	Kaponi *et al*., 2013	P7	P2	Ab1
Apricot vein clearing associated virus	AVCaV	*Betaflexiviridae*	*Prunevirus*	*P. armeniaca*	Elbeaino *et al*., 2014	Ab1	Ab1	Ab1
Arabis mosaic virus	ArMV	*Secoviridae*	*Nepovirus*	*P. avium, P. persica*	Hadidi *et al*., 2011	P7	P2	Ab3
Asian *Prunus* virus 1	APV1	*Betaflexiviridae*	*Foveavirus*	*Prunus* spp.	Marini *et al*., 2009	P2	Ab1	Ab1
Asian *Prunus* virus 2	APV2	*Betaflexiviridae*	*Foveavirus*	*Prunus* spp.	Marais *et al*., 2016	P2	Ab1	Ab1
Asian *Prunus* virus 3	APV3	*Unassigned*	*Unassigned*	*Prunus* spp.	Marais *et al*., 2016	P2	Ab1	Ab1
Carnation Italian ringspot	CIRV	*Tombusviridae*	*Tombusvirus*	*P. avium*	Hadidi *et al*., 2011	Ab1	Ab3	Ab1

PEST	ABBREVIATION	FAMILY	GENUS	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
						CAN	USA	MEX
virus								
Caucasus prunus virus	CPrV	*Betaflexiviridae*	*Prunevirus*	*Prunus* spp.	Marais *et al*., 2015b	Ab1	Ab1	Ab1
Cherry associated luteovirus	ChALV	*Luteoviridae*	*Luteovirus*	*P. avium*	Lenz *et al*., 2017	Ab1	Ab1	Ab1
Cherry green ring mottle virus	CGRMV	*Betaflexiviridae*	*Robiogovirus*	*Prunus* spp.	Hadidi *et al*., 2011	P1	P2	Ab1
Cherry leaf roll virus	CLRV	*Secoviridae*	*Nepovirus*	*P. avium*	Hadidi *et al*., 2011	P3	P2	Ab1
Cherry mottle leaf virus	CMLV	*Betaflexiviridae*	*Trichovirus*	*P. armeniaca, P. avium, P. persica*	Hadidi *et al*., 2011	P2	P2	Ab1
Cherry necrotic rusty mottle virus	CNRMV	*Betaflexiviridae*	*Robigovirus*	*P. armeniaca, P. avium, P. domestica, P. persica*	Villamor *et al*., 2015	P1	P2	Ab1
Cherry rasp leaf virus	CRLV	*Secoviridae*	*Cheravirus*	*Prunus* spp.	Hadidi *et al*., 2011	P2	P2	Ab1
Cherry robigovirus 5	CRV-5	*Betaflexiviridae*	*Robigovirus*	*P. avium*	Wu *et al*., 2019	Ab1	Ab1	Ab1
Cherry rusty mottle associated virus	CRMV or CRMaV	*Betaflexiviridae*	*Robigovirus*	*P. avium*	Hadidi *et al.*, 2011	P1	P2	Ab1
Cherry twisted leaf associated virus	CTLaV	*Betaflexiviridae*	*Robigovirus*	*P. avium*	Hadidi *et al*., 2011	P2	P2	Ab1
Cherry virus A	CVA	*Betaflexiviridae*	*Capillovirus*	*P. armeniaca, P. avium, P. domestica, P. persica*	Hadidi *et al*., 2011	P1	P1	Ab1
Cherry virus F	CVF	*Secoviridae*	*Fabavirus*	*P. avium*	Koloniuk *et al*., 2020; Maliogka *et al.*, 2018	P2	Ab1	Ab1
Cherry virus Trakiya	CVT	Unassigned *Picornavirales (proposed)*	Unassigned	*P. avium*	Milusheva *et al*., 2019	Ab1	Ab1	Ab1
Cherry virus Turkey	CVTR	*Betaflexiviridae*	*Robigovirus*	*P. avium*	Çağlayan *et al*., 2019	Ab1	Ab1	Ab1
Cherry yellow spot-associated virus	CYSaV	*Unassigned in Order Tymovirales*	*Gratylivirus*	*P. davidiana*	Hou *et al*., 2019	Ab1	Ab1	Ab1
Cucumber green mottle mosaic virus	CGMMV	*Virgaviridae*	*Tobamovirus*	*P. armeniaca*	Chitambar, 2018; Tian *et al.*, 2014	P7	P2	Ab1
Cucumber mosaic virus	CMV	*Bromoviridae*	*Cucumovirus*	*P. armeniaca*	Hadidi *et al*., 2011	P7	P2	P2

PEST	ABBREVIATION	FAMILY	GENUS	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
						CAN	USA	MEX
Hop stunt viroid	HSVd	*Popsiviroidae*	*Hostuviroid*	*P. armeniaca, P. avium, P. domestica, P. dulcis, P. persica, P. salicina*	Hadidi *et al.*, 2011	P2	P2	P2
Little cherry virus 1	LChV-1	*Closteroviridae*	*Velarivirus*	*P. avium*	Hadidi *et al.*, 2011	P1 (P3 in BC)	P2	Ab1
Little cherry virus 2	LChV-2	*Closteroviridae*	*Ampelovirus*	*P. avium*	Hadidi *et al.*, 2011	P1 (P3 in BC)	P2	Ab1
Mume virus A	MuVA	*Betaflexiviridae*	*Capillovirus*	*Prunus* spp.	Marais *et al.*, 2018	Ab1	Ab1	Ab1
Nectarine stem pitting associated virus	NSPaV	*Luteoviridae*	*Luteovirus*	*P. persica var. nectarina*	Bag *et al.*, 2015	Ab1	Ab4	Ab1
Nectarine virus M	NeVM	*Tymoviridae*	*Marafavirus*	*P. persica, P. persica var. nectarina*	Villamor *et al.*, 2016	Ab1	P2	Ab1
Peach associated luteovirus	PaLV	*Luteoviridae*	*Luteovirus*	*P. persica*	Wu *et al.*, 2017	Ab1	Ab1	Ab1
Peach chlorotic mottle virus	PcCMV	*Betaflexiviridae*	*Foveavirus*	*P. persica*	James *et al.*, 2007	P2	Ab1	Ab1
Peach latent mosaic viroid	PLMVd	*Avsunviroidae*	*Pelamoviroid*	*P. armeniaca, P. domestica, P. dulcis, P. persica, P. persica var. nectarina*	Hadidi *et al.*, 2011	P1	P2	P2
Peach leaf pitting-associated virus	PLPaV	*Secoviridae*	*Fabavirus*	*P. persica*	He *et al.*, 2017	Ab1	Ab1	Ab1
Peach mosaic virus	PcMV	*Betaflexiviridae*	*Trichovirus*	*P. armeniaca, P. domestica, P. dulcis, P. persica, P. persica var. nectarine, P. salicina*	Hadidi *et al.*, 2011; James *et al.*, 2006	Ab1	P2	Ab1
Peach rosette mosaic virus	PRMV	*Secoviridae*	*Nepovirus*	*P. domestica, P. persica, P. salicina*	Hadidi *et al.*, 2011	P2	P2	Ab1
Peach virus D	PeVD	*Tymoviridae*	*Marafivirus*	*P. persica*	Igori *et al.*, 2017	Ab1	Ab1	Ab1
Peach virus M	PeVM	*Betaflexiviridae*	*Trichovirus*	*P. persica*	De La Torre-	Ab1	Ab1	P2

PEST	ABBREVIATION	FAMILY	GENUS	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
						CAN	USA	MEX
					Almaráz *et al*., 2019			
Petunia asteroid mosaic virus	PeAMV	*Tombusviridae*	*Tombusvirus*	*P. avium*	Hadidi *et al*., 2011	P2	Ab1	Ab1
Plum bark necrosis stem pitting-associated virus	PBNSPaV	*Closteroviridae*	*Ampelovirus*	*P. armeniaca, P. avium, P. domestica, P. dulcis, P. persica*	Hadidi *et al*., 2011	Ab1	P2	Ab1
Plum pox virus	PPV	*Potyviridae*	*Potyvirus*	*Prunus* spp.	Hadidi *et al*., 2011	P3 (Ab5 for NS)	Ab5	Ab3
Prune dwarf virus	PDV	*Bromoviridae*	*Ilarvirus*	*Prunus* spp.	Hadidi *et al*., 2011	P1	P2	Ab1
Prunus geminivirus A	PrGVA	*Geminiviridae*	*Grablovirus*	*P. armeniaca, P. domestica, P. salicina*	Al-Rwahnih *et al*., 2018	Ab1	P2	Ab1
Prunus necrotic ringspot virus	PNRSV	*Bromoviridae*	*Ilarvirus*	*Prunus* spp.	Hadidi *et al*., 2011	P1	P2	Ab3
Prunus virus F	PrVF	*Secoviridae*	*Fabavirus*	*P. avium*	Villamor *et al*., 2017	P2	P2	Ab1
Prunus virus T	PrVT	*Betaflexiviridae*	*Tepovirus*	*Prunus* spp.	Marais *et al*., 2015a	Ab1	Ab1	Ab1
Raspberry ringspot virus	RRSV	*Secoviridae*	*Nepovirus*	*P. domestica*	Hadidi *et al*., 2011	Ab1	Ab1	Ab1
Sowbane mosaic virus	SoMV	*Solemoviridae*	*Sobemovirus*	*P. domestica*	Németh, 1986	P7	P2	Ab1
Stocky prune virus	StPV	*Secoviridae*	*Cheravirus*	*P. domestica, P. persica*	Candresse *et al*., 2006	Ab1	Ab1	Ab1
Strawberry latent ringspot virus	SLRSV	*Secoviridae*	*unassigned*	*P. avium, P. persica, P. salicina*	Tang *et al*., 2013	P2	P2	Ab3
Tobacco mosaic virus	TMV	*Virgaviridae*	*Tobamovirus*	*P. avium, P. cerasus, P. domestica*	Németh, 1986	P7	P2	P2
Tobacco necrosis virus A	TNVA	*Tombusviridae*	*Alphanecrovirus*	*P. armeniaca, P. cerasus, P. domestica*	Németh, 1986	P7	P2	Ab1
Tobacco necrosis virus D	TNVD	*Tombusviridae*	*Bentanecrovirus*	*P. armeniaca, P. cerasus, P. domestica*	Németh, 1986	P7	P7	Ab1
Tobacco ringspot virus	TRSV	*Secoviridae*	*Nepovirus*	*P. avium, P. incisa, P.*	Hadidi *et al*., 2011	P2	P2	P2

PEST	ABBREVIATION	FAMILY	GENUS	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
						CAN	USA	MEX
				persica, P. serrula, P. serrulata				
Tomato black ring virus	TBRV	*Secoviridae*	*Nepovirus*	*Prunus* spp.	Hadidi *et al*., 2011	P7	Ab1	Ab1
Tomato bushy stunt virus	TBSV	*Tombusviridae*	*Tombusvirus*	*P. avium, P. domestica, P. salicina*	Ogawa, 1995	P2	P2	Ab3
Tomato ringspot virus	ToRSV	*Secoviridae*	*Nepovirus*	*P. avium, P. dulcis, P. persica*	Ogawa, 1995	P1	P2	Ab3

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Table 2. Virus pests of pome fruits

Last updated December 2021.

PEST	ABBREVIATION	FAMILY	GENUS	MAIN HOST(S)	REFERENCES	PRESENCE / ABSENCE		
						CAN	USA	MEX
Apple associated luteovirus	AaLV	*Luteoviridae*	*Luteovirus*	*Malus* spp.	Shen *et al.*, 2018	Ab1	P2	Ab1
Apple chlorotic leaf spot virus	ACLSV	*Betaflexiviridae*	*Trichovirus*	*Malus* spp., *Pyrus* spp., *Cydonia* spp., *Chaenomeles* spp,	Hadidi *et al.*, 2011	P1	P2	Ab1
Apple dimple fruit viroid	ADFVd	*Pospiviroidae*	*Apscaviroid*	*Malus* spp.	Hadidi *et al.*, 2011	Ab1	Ab1	Ab1
Apple fruit crinkle viroid	AFCVd	*Pospiviroidae*	*Apscaviroid*	*Malus* spp.	Hadidi *et al.*, 2011	Ab1	Ab1	Ab1
Apple geminivirus	AGV	*Geminiviridae*	*Geminivirus*	*Malus* spp.	Hadidi *et al.*, 2017	Ab1	Ab1	Ab1
Apple green crinkle associated virus	AGCaV	*Betaflexiviridae*	*Foveavirus*	*Malus* spp., *Cydonia* spp.	Morelli *et al.*, 2017	P2	P2	Ab1
Apple hammerhead viroid-like RNA	AHVd	*Avsunviroidae*	*Pelamoviroid*	*Malus* spp.	Szostek *et al.*, 2018; Hadidi *et al.*, 2017	P2	P1	Ab1
Apple latent spherical virus	ALSV	*Secoviridae*	*Cheravirus*	*Malus* spp.	Hadidi *et al.*, 2011	Ab1	Ab1	Ab1
Apple luteovirus 1	ALV	*Luteoviridae*	*Luteovirus*	*Malus* spp.	Lim *et al.*, 2019	P2	P2	Ab1
Apple mosaic virus	ApMV	*Bromoviridae*	*Ilarvirus*	*Malus* spp., *Pyrus* spp.	Grimová *et al.*, 2016; Liang *et al.*, 2015	P1	P2	Ab3
Apple necrotic mosaic virus	ApNMV	*Bromoviridae*	*Ilarvirus*	*Malus* spp.	Noda *et al.*, 2017	Ab1	Ab1	Ab1
Apple rootstock virus A	ApRVA	*Rhabdoviridae*	*Nucleorhabdo-virus*	*Malus* spp.	Morelli *et al.*, 2017	Ab1	Ab1	Ab1
Apple rubbery wood virus 1	ARWV-1	*Phenuiviridae*	*Rubodvirus?*	*Malus* spp., *Pyrus* spp.	Rott *et al.*, 2018	P1	P2	Ab1
Apple rubbery wood virus 2	ARWV-2	*Phenuiviridae*	*Rubodvirus?*	*Malus* spp., *Pyrus* spp.	Rott *et al.*, 2018	P1	P2	Ab1
Apple scar skin viroid	ASSVd	*Pospiviroidae*	*Apscaviroid*	*Malus* spp., *Pyrus* spp.	Hadidi *et al.*, 2017	P2	P2	Ab1
Apple stem grooving	ASGV	*Betaflexiviridae*	*Capillovirus*	*Malus* spp.,	Hadidi *et al.*, 2011	P1	P2	Ab1

PEST	ABBREVIATION	FAMILY	GENUS	MAIN HOST(S)	REFERENCES	PRESENCE / ABSENCE		
						CAN	USA	MEX
virus				*Pyrus* spp.				
Apple stem pitting virus	ASPV	*Betaflexiviridae*	*Foveavirus*	*Malus* spp., *Pyrus* spp.	Hadidi *et al.*, 2017	P1	P2	Ab1
Apricot latent virus	ApLV	*Betaflexiviridae*	*Foveavirus*	*Malus* spp.	Hadidi *et al.*, 2011	Ab1	Ab1	Ab1
Cherry leaf roll virus	CLRV	*Secoviridae*	*Nepovirus*	*Malus* spp.	Woo *et al.*, 2012	P7	P2	Ab1
Cherry rasp leaf virus	CRLV	*Secoviridae*	*Cheravirus*	*Malus* spp.	Noda *et al.*, 2017	P2	P2	Ab1
Citrus concave gum-associated virus	CCGaV	*Bunyaviridae?*	*Bunya-like virus*	*Malus* spp.	Wright *et al.*, 2018	Ab1	P2	Ab1
Citrus virus A	CiVA	*Bunyaviridae?*	*Bunya-like virus*	*Pyrus* spp.	Baek *et al.*, 2019	Ab1	Ab1	Ab1
Hop stunt viroid	HSVd	*Pospiviroidae*	*Hostuviroid*	*Pyrus* spp.	Hadidi *et al*., 2017	P7	P2	P2
Malus domestica virus A	MdoVA	*Closteroviridae*	*Velarivirus*	*Malus* spp.	Rott *et al*., 2018	Ab1	Ab1	Ab1
Peach latent mosaic viroid	PLMVd	*Avsunviroidae*	*Pelamoviroid*	*Pyrus* spp.	Hadidi *et al*., 2017	P7	P2	P2
Pear blister canker viroid	PBCVd	*Pospiviroidae*	*Apscaviroid*	*Pyrus* spp.	Rott *et al.*, 2018	P2	P2	Ab1
Prunus necrotic ringspot virus	PNRSV	*Bromoviridae*	*Ilarvirus*	*Malus* spp.	Hadidi *et al*., 2017	P7	P2	Ab3
Pyrus pyrifolia cryptic virus	PpCV	*Partitiviridae*	*Deltapartitivirus*	*P. pyrifolia*	Osaki *et al.*, 2017	Ab1	Ab1	Ab1
Raspberry bushy dwarf virus	RBDV	*Unassigned, proposed Bromoviridae*	*Idaeovirus*	*Cydonia* spp.	Hadidi *et al*., 2011	P7	P2	Ab1
Tobacco ringspot virus	TRSV	*Secoviridae*	*Nepovirus*	*Malus* spp.	Hadidi *et al*., 2011	P2	P2	P2
Tomato ringspot virus	ToRSV	*Secoviridae*	*Nepovirus*	*Malus* spp.	Hadidi *et al*., 2011	P2	P2	Ab3

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Table 3: Fungal pathogens (incl. Chromista) of stone and pome fruit trees

Last updated December 2021.

PEST	MAIN HOST(S)	DISEASE	REFERENCE	PRESENCE/ABSENCE		
				CAN	USA	MEX
Alternaria alternata (Fr.: Fr.) Keissl. Syn.*:* *Alternaria mali* Roberts	*Malus* spp.	Alternaria blotch	Jones and Aldwinckle, 1990	P2	P2	Ab1
Alternaria gaisen Nagano ex Hará. Syn.: *Alternaria kikuchiana* Tanaka	*Pyrus* spp.	Japanese pear black spot	Dickens and Cook, 1995; Sutton *et al*., 2014	Ab1	Ab3	Ab1
Apiognomonia erythrostoma (Fuckel) Höhn (Pers.) V. Hohnel.	*Prunus armeniaca, Prunus avium, Prunus cerasus*	Red spot, leaf scorch, gnomoniosis	Chen *et al*., 2002; Hecht and Zinkernagel, 2006; Ogawa *et al*., 1995	Ab1	Ab3	Ab1
Athelia rolfsii (Curzi) C.C. Tu and Kimbr. Syn.*:* *Sclerotium rolfsii* Sacc	*Prunus* spp., *Malus* spp.	Sclerotium Stem Rot, Southern blight	Ogawa *et al.,* 1995; Ohlendorf, 1999*;* Sutton *et al.,* 2014	P7	P2	P2
Berkeleyomyces basicola (Berk. and Broome) W.J. Nel, Z.W. de Beer, T.A. Duong and M.J. Wingf*.* Syn.*:* *Thielaviopsis basicola* (Berk. and Broome) Ferraris*, Chalara elegans* Nag Raj and W.B. Kendr	*Prunus avium*	Black root rot	Sewell and Wilson*,* 1975*;* Sønderhousen*,* 1970	P1	P2	Ab3
Blumeriella jaapii (Rehm) Arx	*Prunus* spp.	Leaf spot, Shot hole	Joshua and Mmbaga*,* 2015; Ogawa *et al.,* 1995; USDA*,* 2020	P1	P2	Ab1
Botryosphaeria dothidea (Moug.:Fr.) Ces. and De Not. (Moug. ex Fr.) Ces. and De Not. Syn.: *Fusicoccum aesculi* Corda	*Prunus* spp., *Pyrus* spp., *Malus* spp.	Fungal gummosis (Prunus), white rot (Malus)	Ko *et. al.,* 2010; Ogawa *et al.*, 1995; Sutton *et. al.*, 2014	P2	P2	Ab3
Botryosphaeria kuwatsukai (Hara) G.Y. Sun and E. Tanaka. Syn.: *Guignardia piricola* (nose) W. Yanam, *Macrophoma kuwatsukai* Hara, *Botryosphaeria berengeriana* f. sp. *pyricola* (Nose) Kogan. and	*Prunus americana, Pyrus pyrifolia, Malus domestica*	Apple ring rot, Plum wilt	Deng *et al.,* 2004; Sutton *et al.,* 2014; Xu *et al.,* 2015	Ab1	Ab1	Ab1

PEST	MAIN HOST(S)	DISEASE	REFERENCE	PRESENCE/ABSENCE		
				CAN	USA	MEX
Sakuma, *Guignardia pyricola* (Nose) W. Yamam						
Botrytis cinerea Pers.: Fr. Syn.: *Botryotinia fuckeliana* (de Bary) Whetzel	*Chaenomeles* spp., *Prunus* spp., *Pyrus* spp. and *Malus* spp.	Gray mold, dry eye rot blossom end rot green fruit rot	Norina and Rumpunen, 2003; Ferrada *et al.,* 2016; Strand, 1999; Sutton *et al.,* 2014	P2	P2	P2
Cadophora malorum (Kidd and Beaumont) W. Gams Syn.: *Phialophora malorum* (Kidd and Beaumont) McColloch	*Malus* spp., *Pyrus* spp.	Side rot	McColloch, 1944; Sugar and Spotts, 1992; Sutton *et al.,* 2014	P2	P2	Ab3
Ceratobasidium ochroleucum (F. Noack) Ginns and M.N. Lefebvre Syn.: *Corticium stevensii* Burt	*Malus* spp., *Pyrus* spp.	Thread blight	Jones and Sutton, 2019; Sutton *et al.,* 2014	Ab1	P2	Ab3
Colletotrichum gloeosporioides (Penz.) Penz. and Sacc. Syn.: *Glomerella cingulata* (Stoneman) Spauld. and H. Schrenk	*Prunus dulcis*, *Prunus* spp., *Malus* spp., *Pyrus* spp.	Anthracnose, Fruit rot, Bitter rot, Black spot	Haviland *et al*., 2019; Ogawa *et al*., 1995; Sutton *et al.,* 2014	P1	P2	P2
Cylindrocarpon didymum (Harting) Wollenweb.	*Malus* x *domestica*	Twig blight, Black foot	Dugan and Grove, 1994; Littke and Brwning 2001	P7	P2	Ab3
Cytospora ceratosperma (Tode) G.C. Adams and Rossman. Syn.: *Valsa ceratosperma* (Tode) Maire, *Cytospora sacculus* (Schwein.) Gvritischvili	*Cydonia oblonga, Malus* spp., *Pyrus* spp.	Valsa canker	CABI 2021; Sutton *et al.,* 2014	P7	P2	Ab1
Cytospora cincta Sacc. Syn.: *Leucostoma cinctum* (Fr.: Fr.) Höhn., *Leucostoma cincta* (Fr.: Fr.) Höhn.; *Valsa cincta* (Fr.: Fr.) Fr.	*Prunus avium, Prunus* spp., *Malus* spp.	Dieback, Perennial canker	Barakat and Johnson, 1997; Brown-Rytlewski and McManus, 2000; Jones, 1989; Ogawa *et al*., 1995; Proffer and Jones, 1989; Sutton *et al*., 2014	P2	P2	Ab1
Cytospora leucostoma (Pers.) Sacc. Syn.: *Leucostoma persoonii* (Nitschke) Höhn., *Valsa leucostoma* (Pers.: Fr.) Fr.	*Cydonia, Prunus domestica, Prunus* spp.	Dieback, canker	Biggs and Grove, 2005; Ogawa *et al*., 1995; Strand, 1999	P1	P2	Ab1

PEST	MAIN HOST(S)	DISEASE	REFERENCE	PRESENCE/ABSENCE		
				CAN	USA	MEX
Diaporthe ambigua Nitschke Syn.: *Phomopsis ambigua* (Sacc.) Traverso	*Malus domestica, Prunus salicina, Pyrus communis, Malus* spp.	Constriction canker, Phomopsis fruit rot, Branches dieback	Havenga *et al*., 2019; Smit, 1996	P2	P2	Ab1
Diaporthe amygdali (Delacr.) Udayanga, Crous and K.D. Hyde Syn.: *Phomopsis amygdali* (Del.) Tuset and Portilla, *Fusicoccum amygdali* Del.	*Prunus dulcis, Prunus persica, Malus* spp, *Pyrus pyrifolia*	Constriction canker, Phomopsis fruit rot, Branches dieback	Bai *et al*., 2015; Havenga *et al*., 2019; Haviland *et al*., 2019; Ogawa *et al*., 1995	P2	P2	Ab1
Diaporthe eres Nitschke Syn.: *Phomopsis fukushii* Tanaka and S. Endô, *Phomopsis oblonga* (Desm.) Traverso	*Cydonia oblonga, Malus* spp., *Prunus avium, P. persica, Pyrus pyrifolia*	Bark canker	Abramczyk *et al*., 2018; Ali *et al*., 2019; Bai *et al*., 2015; Prencipe *et al.*, 2017; Ristić *et al*., 2016	P2	P2	Ab1
Diaporthe perniciosa Marchal and É.J. Marchal. Syn.: *Phomopsis mali* Roberts	*Malus* spp., *Pyrus* spp., *Prunus* spp.	Canker and fruit decay	Ogawa, 1995; Sutton *et al.*, 2014	P2	P2	Ab1
Diaporthe tanakae Ts. Kobay. and Sakuma Kobayashi and Sakuma Syn.: *Phomopsis tanakae* Kobayashi and Sakuma	*Malus* spp., *Pyrus* spp.	Canker	Sutton *et al*., 2014	Ab1	Ab1	Ab1
*Didymosphaeria rubi-ulmifol*ii Ariyaw., Camporesi and K.D. Hyde	*Prunus pérsica, Malus* spp.		Havenga *et al*.,2019; Liang *et al*., 2020	Ab1	Ab1	Ab1
Diplodia mutila (Fr.: Fr.) Mont. Syn.: *Botryosphaeria stevensii* Shoemaker, *Physalospora malorum* Shear, N. Stevens, and M.S. Wilcox	*Malus* spp., *Pyrus* spp., *Prunus salicina, Prunus laurocerasus*	Black rot, Dieback, Diplodia Canker.	Damm *et al.,* 2007; Jones and Aldwinckle, 1990; Sutton *et al.*, 2014; Úrbez-Torres *et al*., 2016; Zlatković *et al*., 2018	P1	P2	Ab1
Diplodia seriata De Not. Syn.: *Botryosphaeria obtusa* (Schwein.) Shoemaker, *Sphaeropsis malorum* Berk.	*Cydonia oblonga, Prunus dulcis, Malus* spp., *Pyrus pyrifolia*	Dieback, Black rot, Fungal gummosis	Haviland *et al*., 2019; Mohammadi and Sharifi, 2016; Sutton *et al*., 2014	P1	P2	P2

PEST	MAIN HOST(S)	DISEASE	REFERENCE	PRESENCE/ABSENCE		
				CAN	USA	MEX
Ellisembia asterinum (Cooke) Shoemaker and Hambl. Syn.: *Helminthosporium papulosum* A. Berg	*Malus* spp., *Pyrus* spp.	Black pox of apple, Blister canker of pear	Sutton *et al*., 2014	Ab1	P2	Ab1
Erythricium salmonicolor (Berk. and Broome) Burdsall	*Malus* spp., *Pyrus* spp.	Pink disease	Momol *et al.,* 2017; Prasad, 2013	Ab1	P2	Ab3
Erythricium salmonicolor (Berk. and Broome) Burds. Syn.: *Corticium salmonicolor* Berk. and Broome	*Malus* spp., *Pyrus* spp.	Pink disease, Limb blight	Momol *et al*., 2007; Prasad, 2013	Ab1	P2	Ab3
Eutypa lata (Pers.) Tul. and C. Tul.	*Cydonia oblonga, Prunus armeniaca, Prunus avium, Prunus domestica*	Eutypa dieback, Gummosis disease	Moyo *et al*., 2017; Ogawa *et al.,* 1995; Strand, 1999	P2	P2	Ab3
Gloeodes pomigena (Schwein.) Colby. Syn.: *Phyllachora pomigena* (Schwein.) Sacc.	*Malus* spp., *Pyrus* spp., *Prunus* spp.	Sooty blotch, flyspeck	Estafne, 2015; Jones and Aldwinckle, 1990; USDA, 2020; Wilcox, 1994; Ogawa *et al*., 1995	P2	P2	Ab1
Gloeocystidiellum sacratum (G. Cunn.) Stalpers and P.K. Buchanan. Syn.: *Peniophora sacrata* G. Cunn.	*Malus sylvestris, Malus* spp.	Peniophora root canker	Sutton *et al*., 2014	Ab1	Ab1	Ab1
Gloeosporium laeticolor Berk.	*Prunus persica*	Anthracnose	Ogawa *et al*., 1995	Ab1	Ab1	Ab1
Gymnosporangium asiaticum Miyabe ex G. Yamada. Syn.: *Roestelia koreaënsis* Henn.	*Pyrus* spp., *Chaenomeles* spp., *Cydonia oblonga*	Japanese pear rust	Kikuhara *et al*., 2019; Sutton *et al*., 2014; Yun *et al*., 2009	Ab1	P2	Ab1
Gymnosporangium clavipes Cooke and Peck (Cooke and Peck) Cooke and Peck en Peck	*Malus* spp., *Chaenomeles* spp., *Cydonia* spp. *Pyrus calleryana*;	Quince rust	Bergdahl *et al*., 2016; Creswell *et al*., 2015; Ellis, 2016; Gauthier and Heisdorffer, 2015; MBG, 2020	P1	P2	P2
Gymnosporangium globosum (Farl.) Farl.	*Malus* spp., *Pyrus* spp.	American hawthorn rust	Jones and Aldwinckle, 1990	P1	P1	P2

PEST	MAIN HOST(S)	DISEASE	REFERENCE	PRESENCE/ABSENCE		
				CAN	USA	MEX
Gymnosporangium juniperi-virginianae Schwein.	*Malus* spp.	Cedar-apple rust	Bergdahl *et al*., 2016; Gauthier and Heisdorffer, 2015; Morton Arboretum, 2020	P2	P2	Ab1
Gymnosporangium kernianum Bethel	*Pyrus* spp.	Kern's pear rust	Jones and Aldwinckle, 1990	Ab1	P2	Ab3
Gymnosporangium libocedri (Henn.) F. Kern	*Pyrus* spp., *Cydonia, Chaenomeles*	Pacific coast pear rust	Windbiel-Rojas *et al.,* 2020; Worrall, 2020	Ab1	P2	Ab1
Gymnosporangium nelsonii Arthur.	*Pyrus* spp.	Rocky mountain pear rust	Jones and Aldwinckle, 1990	P2	P2	Ab3
Gymnosporangium sabinae (Dicks.) G. Winter Syn.: *Gymnosporangium fuscum* R. Hedw. in DC	*Pyrus calleryana Pyrus* spp.	European pear rust, Pear trellis Rust	Hansen *et al.,* 2016; Lim *et al.,* 1978; Sutton *et al*., 2014	P2	P2	Ab1
Gymnosporangium yamadae Miyabe ex G. Yamada	*Malus* spp.	Japanese apple rust	Gregory *et al.*, 2010, Sutton *et al.,* 2014	Ab1	P2	Ab1
Helicobasidium mompa Tanaka Syn.: *Septobasidium mompa* (Tanaka) Racib.	*Prunus* spp., *Malus* spp.	Violet root rot	Nakamura *et al*., 2004; Ogawa *et al.*, 1995; Sutton *et al*., 2014	Ab1	Ab1	Ab1
Monilinia fructigena Honey in Whetzel (Aderh. and Ruhland) Honey	*Prunus* spp., *Malus* spp., *Pyrus* spp.	Brown rot, Blossom and twig blight	Lesik, 2013; Ogawa *et al*., 1995; Sutton *et al*., 2014	Ab1	Ab3	Ab1
Monilinia kusanoi (Henn. ex Takah.) (Takah.) W. Yamamoto. Syn.: *Monilia kusanoi* P. Henn.	*Prunus* spp., *Prunus avium, Prunus grayana*	Leaf blight, green fruit rot	Ogawa *et al*., 1995	Ab1	Ab1	Ab1
Monilinia laxa (Aderhhold and Ruhland) Honey. Syn.: *Sclerotinia laxa* Aderh and Ruhland	*Prunus* spp., *Malus* spp. *Chaenomeles* spp., *Pyrus* spp.	Brown rot	Haviland *et al*., 2019; Lesik 2013; Norina and Rumpunen, 2003; Sutton *et al.*, 2014	P2	P2	Ab1
Monilinia linhartiana (Prill. and Delacr.) N.F. Buchw. Syn.: *Monilia cydoniae* Schellenb.	*Cydonia oblonga*	Leaf blotch, Shoot blight	Lantos *et al*., 2017	Ab1	Ab1	Ab1
Monilinia mali (Takah.) Whetzel. Syn.: *Sclerotinia mali* Takah.	*Malus* spp.	Blossom blight, leaf blight	Sutton *et al.,* 2014; Webster *et al.*, 2020	Ab1	Ab1	Ab1

PEST	MAIN HOST(S)	DISEASE	REFERENCE	PRESENCE/ABSENCE		
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Monilia polystroma G. van Leeuwen *et al*. Syn.: *Monilinia polystroma* (G.C.M. Leeuwen) Kohn	*Malus* spp., *Pyrus* spp.	Brown rot	Petróczy and Palkovic, 2009; Van Leeuwen *et al.*, 2002	Ab1	Ab1	Ab1
Neofabraea malicorticis (Cordley) H. Jacks. Syn.: *Cryptosporiopsis curvispora* (Peck) Gremmen, *Pezicula malicorticis* (Cordley) Nannf.	*Malus* spp.	Anthracnose canker and Perennial canker	Brun and Bush, 2016; Sutton *et al.*, 2014	P2	P2	Ab3
Neofusicoccum ribis (Slippers, Crous and M.J. Wingf.) Crous, Slippers and A.J.L. Phillips Syn.: *Botryosphaeria ribis* Grossenb. and Duggar, *Dothiorella ribis* (Fuckel) Sacc	*Malus* spp., *Pyrus* spp.	Fruit rot, gummosis	Brown II and Briton, 1986; Elliot, 2015; Vovey Jr. 1967; Jurick *et al.*, 2013; Urbez-Torres *et al.*, 2012; WPFUS, 2020	P7	P1	Ab3
Neonectria ditissima (Tul. and C. Tul.) Samuels and Rossman Syn.: *Nectria galligena* Bres., *Neonectria galligena* (Bres.) Rossman and Samuels, *Cylindrocarpon heteronema* (Berk. and Broome) Wollenw.	*Malus* spp., *Pyrus* spp.	European canker, Thread blight	Ohlendorf, 1999; Sutton *et al.*, 2014; Wunderlich *et al.*, 2017	P2	P2	Ab3
Phacidiopycnis pyri (Fuckel) Weindlm J. Weindlymayr. Syn.: *Discula pyri* (Fuckel) Höhn, *Potebniamyces pyri* (Berk. and Broome) Dennis, *Potebniamyces discolor* (Mouton and Sacc.) Smerlis	*Pyrus* spp., *Malus* spp.	Canker, stem end rot	Amiri, 2020; Xiao and Boal, 2005	P2	P2	Ab1
Phacidiopycnis washingtonensis C. L. Xiao and J. D. Rogers	*Pyrus* spp., *Malus* spp.	Speck rot	Amiri, 2020; Xiao *et al*. 2005	Ab1	P2	Ab1
Phaeoacremonium parasiticum (Ajello, Georg and C.J.K. Wang) W. Gams, Crous and M.J. Wingf. Syn.: *Phialophora parasitica* Ajello, Georg and Wang	*Cydonia oblonga, Prunus avium, Prunus armeniaca, Prunus salicina, Malus* spp., *Pyrus* spp.	Dieback	Damm *et al*., 2008; Groenewald *et al*., 2001; Mohammadi and Sharifi, 2016; Ogawa *et al*., 1995; Rumbos, 1986; Sami *et al*., 2014	Ab1	P2	Ab1

PEST	MAIN HOST(S)	DISEASE	REFERENCE	PRESENCE/ABSENCE		
				CAN	USA	MEX
Phaeoacremonium scolyti L. Mostert, Summerb. and Crous	*Cydonia oblonga, Malus* spp., *Pyrus* spp. *Prunus* spp.	Esca and Petri disease	Damm *et al*., 2008, Havenga *et al*., 2019; Sami *et al*., 2014	Ab1	Ab1	Ab1
Phaeoacremonium parasiticum (Ajello, Georg and C.J.K. Wang) W. Gams, Crous and M.J. Wingf. Syn.: *Phialophora parasitica* Ajello, Georg and Wang	*Cydonia oblonga*; *Prunus avium, Prunus armeniaca, Prunus salicina*; *Malus* spp., *Pyrus* spp.	Dieback	Damm *et al*., 2008; Mohammadi and Sharifi, 2016; Ogawa *et al*., 1995; Rumbos 1986; Sami *et al*., 2014	Ab1	P2	Ab1
Phyllosticta arbutifolia Ellis and G. Martin Syn.: *Phyllosticta solitaria* Ellis and Everh.	*Malus* spp.	Blotch	Jones and Aldwinckle, 1990; Sutton *et al*., 2014	P2	P2	Ab1
Phymatotrichopsis omnivora (Duggar) Hennebert	*Malus* spp., *Prunus* spp., *Pyrus* spp., *Cydonia* spp.	Texas root rot	Jones and Aldwinckle, 1990; Ogawa *et al*., 1995; Sutton *et al*., 2014	Ab1	P2	Ab3
Phytophthora cambivora (Petri) Buisman	*Malus* spp., *Prunus* spp.	Ink disease, Collar rot, Root rot, Trunk canker	Erwin and Ribeiro, 1996; Ogawa *et al*., 1995; Rooney-Latham *et al*., 2018; Sutton *et al*., 2014	P2	P2	Ab1
Phytophthora cryptogea Pethybr. and Lafferty	*Prunus* spp., *Malus* spp.	Collar rot	Erwin and Ribeiro, 1996; Jones and Aldwinckle, 1990; Latorre *et al.,* 2001; Ogawa *et al*., 1995; Sutton *et al*., 2014	P5	P2	P2
Phytophthora drechsleri Tucker	*Malus* spp., Prunus spp.	Root rot, Trunk canker	Erwin and Ribeiro, 1996; Sutton *et al*., 2014	P7	P2	P2
Phytophthora megasperma Dreschsler	*Malus* spp., *Prunus* spp.	Collar rot, crown rot	Erwin and Ribeiro, 1996, Jones and Aldwinckle, 1990; Kurbetli and Yilmaz, 2015; Ogawa *et al*., 1995	P7	P2	Ab1
Phytophthora syringae (Kleb.) Kleb.	*Malus* spp., *Prunus* spp., *Pyrus* spp.	Fruit rot	Grigel *et al.,* 2019; Jones and Aldwinckle, 1990; Ogawa *et al*., 1995; Sutton *et al*., 2014	P2	P2	Ab1

PEST	MAIN HOST(S)	DISEASE	REFERENCE	PRESENCE/ABSENCE		
				CAN	USA	MEX
Phytopythium vexans (de Bary) Abad, de Cock, Bala, Robideau, Lodhi and Lévesque Syn.: *Pythium vexans* de Bary	*Prunus persica*	Damping-off, root rot	Biesbrock and Hendrix Jr., 1970; Hendrix *et al*., 1966	P7	P2	Ab1
Podosphaera pannosa (Wallr.: Fr.) de Bary. Syn.: *Sphaerotheca pannosa* (Wallr.: Fr.) Lév	*Prunus* spp., *Pyrus* spp.	Powdery mildew	Ogawa *et al.,* 1995; Pscheidt and Ocamb, 2020; Strand, 1999	P1	P2	P2
Pythium irregulare Buisman	*Malus* spp.	Replant disease	Braun, 1991	P1	P1	P2
Rosellinia necatrix Berl. ex Prill. Syn.: *Dematophora necatrix* R. Hartig	*Cydonia oblonga, Pyrus spp., Prunus* spp., *Malus* spp.	Root rot	Ogawa *et al*., 1995; Pastorelli, 2012; Strand,1999; Sutton *et al.*, 2014; Thomas *et al.,* 1953; Van den Berg *et al.*, 2018	Ab1	P2	P2
Tranzschelia discolor (Fuckel) Tranzschel and M.A. Litv. Syn.: *Tranzschelia pruni-spinosae* var. discolor (Pers. :Pers.) Dietel var. discolor (Fuckel) Dunegan	*Prunus* spp.	Rust	Haviland *et al*., 2019; Ogawa *et al*., 1995; Soto-Estrada *et al.,* 2005; Strand,1999	P2	P2	Ab3
Venturia carpophila E.E. Fisher Syn.: *Fusicladium amygdali Ducomet, Cladosporium carpophilum* Thüm.	*Prunus* spp.	Peach scab	Haviland *et al*., 2019; Ogawa *et al*., 1995	P1	P2	Ab1
Venturia nashicola S. Tanaka and S. Yamamoto Syn.: *Fusicladium nashicola* K. Schub. and U. Braun	*Pyrus pyrifolia*, *Pyrus ussuriensis*	Asian Pear scab	Li *et al.*, 2003; Sutton *et al.*, 2014	Ab1	Ab1	Ab1
Verticillium albo-atrum Reinke and Berthier Berthold	*Prunus* spp.	Verticllium wilt	Ogawa *et al*., 1995	P1	P2	P2
Verticillium dahliae Kleb.	*Prunus* spp.	Verticillium wilt	Pscheidt and Ocamb, 2020; Ogawa *et al.,*1995	P1	P2	P2

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Table 4. Bacterial pathogens of stone and pome fruit trees

Last updated December 2021.

PEST	MAIN HOST(S)	DISEASE	REFERENCES	PRESENCE / ABSENCE		
				CAN	USA	MEX
Candidatus Phytoplasma asteris' Lee *et al.* (16SrI-B)	*P. avium*, *P. persica*, *Pyrus communis, Malus domestica*	Aster yellows, apple sessile leaf, sweet/sour cherry decline	Caglayan *et al*., 2013; Davis, 2020; Jomantiene and Davis, 2005; Lee *et al.*, 2004; Zunnoon-Khan *et al.*, 2010b	Ab1	P2	P2
Candidatus Phytoplasma mali Seemüller and Schneider (16SrX)	*P. armeniaca, P. avium, P. domestica*, *Malus domestica, Pyrus* spp.	Apple Proliferation, Sweet/sour cherry decline	Bulgariet *et al.,* 2012; Mehle *et al*., 2006	Ab1	Ab1	A1
Candidatus Phytoplasma pear decline Taiwan	*Pyrus* spp.	Pear decline Taiwan	Liu *et al*., 2007	Ab1	Ab1	Ab1
Candidatus Phytoplasma phoenicium' Verdin *et al*. (16SrIX-B)	*Prunus dulcis*, *Prunus* spp.	Almond's witches broom, almond brooming	Salehi *et al*., 2006; Zirak *et al.,* 2019	Ab1	Ab1	Ab1
Candidatus Phytoplasma pruni Davis *et al*. (16SrIII-A)	*P. armeniaca, P. avium, P. cerasus, P. domestica, P. dulcis, P. persica, P. persica* var. *nectarina, P. salicina, Prunus* spp.	X-disease, Cherry buckskin, Cherry Western X disease, Prunus X disease	Davis *et al*., 2013; Davis *et al*., 2019	P5	P2	P2
Candidatus Phytoplama prunorum' Seemuller and Schneider (16SrX-B)	*Prunus arnenuca, P. avium, P. domestica, P. dulcis, P. persica, P. salicina, Prunus* spp.	European stone fruit yellows, apricot chlorotic leafroll, plum leptonecrosis, plum decline, peach yellows, peach decline, European peach yellows	Krizanac *et al*., 2010	Ab1	Ab1	Ab1
Candidatus Phytoplasma pyri' (16SrX-C) Seemüller and Schneider., Syn.: Phytoplasma pyri	*P. persica, Pyrus* spp.	Pear decline, Peach yellow leaf roll, peach decline	EPPO, 2017; Hunter *et al.*, 2010; Sabate *et al*.,2014	P2	P2	Ab1

PEST	MAIN HOST(S)	DISEASE	REFERENCES	PRESENCE / ABSENCE		
				CAN	USA	MEX
Seemüller and Schneider						
Candidatus Phytoplasma solani' Quaglino *et al.* (16SrXII-A)	*Malus domestica, P. armeniaca, P. persica*	none	Quaglino *et al.,* 2013	Ab1	Ab1	Ab1
Candidatus Phytoplasma ziziphi' Jung *et al*. (16SrV-B)	*Malus* spp., *P. salicina*	none	Li *et al*., 2014; Gao *et al*., 2019	Ab1	Ab1	Ab1
Dickeya fangzhongdai Tian, Zhao, Yuan, Yi, Fan, Xu, *et al*.	*Pyrus* spp.	Bleeding canker	Zhao *et al*., 2018	Ab1	Ab3	Ab1
Erwinia amylovora (Burrill) Winslow *et al*.	*Malus* spp., *Pyrus* spp., *Prunus domestica, Chaenomeles* spp.	Fire blight	Emeriewen *et al*., 2019; Norin and Rumpunen, 2003; Sutton *et al*., 2014; Vegh *et al*., 2012	P1	P2	P2
Erwinia pyrifoliae Kim *et al*.	*Pyrus pyrifolia*	Asian pear blight	Sutton *et al*., 2014	Ab1	Ab1	Ab1
Erwinia uzenensis Matsuura *et al*.	*Pyrus* spp.	Bacterial black shoot disease of European pear	Matsura *et al*., 2012	Ab1	Ab1	Ab1
Pseudomonas amygdale Psallidas and Panagopoulos	*Prunus* spp.	Almond bacteriosis	Sutton *et al*., 2014; Ruinelli *et al*., 2019	Ab1	Ab1	Ab1
Pseudomonas syringae pv. *morsprunorum* (Wormald) Young *et al*.	*P. avium*, *P. domestica*, *P. persica*	Bacterial canker of stone fruits; dieback	Ahmed *et al*., 2018; Hulin *et al.*, 2018; Latorre and Jones 1979; Sutton *et al*., 2014	P1	P2	Ab1
Pseudomonas syringae pv. *papulans* (Rose) Dhanvantari	*Malus* spp.	Blister spot	Kerkoud *et al*., 2000	P2	P2	Ab1
Pseudomonas syringae pv. *persicae* Prunier, Luisetti and	*Prunus* spp.	Bacterial decline of stone fruits, Bacterial shoot dieback	Hulin *et al*., 2018; Sutton *et al*., 2014; Zhao *et al*., 2015	Ab1	Ab1	Ab1

PEST	MAIN HOST(S)	DISEASE	REFERENCES	PRESENCE / ABSENCE		
				CAN	USA	MEX
Gardan						
Pseudomonas syringae pv. *syringae* van Hall	*Malus* spp., *Pyrus* spp., *P. avium*, *P. armeniaca*, *P. domestica*, *P. dulcis*, *P. persica*, *P. salicina*	Bacterial canker and fruit spot; blossom blast of pear; blister bark of apple	Gasic *et al.,* 2018; Hulin *et al*, 2018; Little *et al.,* 1998; Ogawa *et al*., 1995; Sutton *et al*., 2014; Xu *et al*., 2008	P1	P2	Ab3
Rhizobium radiobacter (Smith and Townsend) Young *et al*., syn.: *Agrobacterium tumefaciens* (Smith and Townsend) Conn	*Malus* spp., *P. armeniaca, Prunus* spp., *Pyrus* spp.	Crown gall	Aysan *et al*., 2003; CABI 2021; Moore and Putnam, 2020	P1	P2	P2
Rhizobium rhizogenes (Riker *et al.* 1930) Young *et al*., syn.: *Agrobacterium rhizogenes* (Riker *et al*., 1930) Conn	*Prunus avium*, *Prunus* spp.	Crown gall, Hairy root of apple	Pulawska *et al*., 2016	P2	P2	P2
Xanthomonas arboricola pv. *pruni* (Smith) Vauterin Hoste, Kersters and Swings	*P. armeniaca*, *P. avium*, *P. domestica*, *P. dulcis*, *P. persica, P. persica* var. *nectarina*	Leaf and fruit spot and stem canker or bacterial canker of stone fruit	Garita-Cambronero, *et al*., 2018	P2	P2	Ab1
Xanthomonas prunicola. The type strain is CFBP 8353, syn. CECT 9404=IVIA 3287.1)	*Prunus persica, P. persica* var. *nectarina*	Necrotic lesions on leaves	López, *et al*., 2018	Ab1	Ab1	Ab1
Xylella fastidiosa subsp. pauca Schaad *et al*.	*Prunus avium*	Citrus variegated chlorosis	Saponari *et al*., 2014	Ab1	Ab1	Ab1
Xylella fastidiosa Wells *et al*.	*P. domestica, P. dulcis*	Phony peach disease; plum leaf scald; almond scorch; Pierce's disease	Alves *et al*., 2004; Chen *et al.,* 2008; Janse and Obradovic, 2010; Sutton *et al*., 2014	P7	P2	P3

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Table 5: Nematode pests of stone and pome fruit trees

Last updated December 2021.

PEST	MODE OF PARASITISM	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
				CAN	USA	MEX
Criconema mutabile Taylor	Ectoparasite	*Cydonia oblonga, Prunus persica, Prunus domestica, P armeniaca*	Hugo and Storey, 2017; Zasada *et al*., 2019	Ab1	P2	P2
Criconemoides curvatum	Ectoparasite	*Prunus persica, Prunus avium*	Bridge and Starr, 2007	P2	P7	Ab3
Criconemoides ornatus	Ectoparasite	*Prunus persica*	Ratanaworabhan and Smart, 1970	Ab1	Ab3	Ab1
Helicotylenchus digonicus Perry	Migratory ecto and semi endoparasite	*Malus* spp., *Pyrus* spp.	Khan *et al.,* 2013; Siddiqui *et al*., 1973	P2	P2	P2
Helicotylenchus dihystera (Cobb) Sher	Migratory ecto and semi endoparasite	*Cydonia oblonga, Malus* spp., *Prunus avium, Prunus salicina, Prunus persica*	Marais and Swart, 1998; Ogawa *et al.,* 1995; Poiras *et al.,* 2013; Sharma *et al*., 2005	P7	P2	P2
Helicotylenchus erythrinae (Zimmermann) Golden	Migratory ecto and semi endoparasite	*Malus* spp., *Prunus persica*	Siddiqui *et al.,* 1973; Zavaleta-Mejia and Sosa-Moss, 1979	P7	P2	P2
Helicotylenchus platyurus	Migratory ecto and semi endoparasite	*Prunus* spp.	Hafez *et al.,* 2010	P2	P2	Ab1
Helicotylenchus pseudorobustus (Steiner) Golden	Migratory ecto and semi endoparasite	*Prunus armeniaca, Prunus avium, Prunus domestica, Prunus persica* var nucipersica, *Prunus persica*	Subbotin *et al*., 2015	P2	P2	Ab1
Longidorus africanus Merny	Root tip ectoparasite	*Prunus* spp.	Xu and Zhao, 2019	Ab1	P2	Ab1
Longidorus attenuatus Hooper	Root tip ectoparasite	*Pyrus communis*	Arias and Andres, 1989; Andres *et al.,* 1991; CABI 2021 edition; Griffiths and Robertson, 1984; Raski 1988	Ab1	Ab1	Ab1
Longidorus breviannulatus Norto and Hoffmann	Root tip ectoparasite	*Malus* spp., *Prunus avium, Prunus persica*	Simard *et al*., 2009; Van Driell *et al*., 1990; Xu and Zhao, 2019	P2	P2	Ab1
Longidorus brevicaudatus Norton and Hoffmann	Root tip ectoparasite	*Malus* spp.	Lone *et al.*, 2018	Ab1	Ab1	Ab1
Longidorus caespiticola Hopper, [*Longidorus*	Root tip ectoparasite	*Malus domestica, Prunus avium, Prunus*	Arias and Andres, 1989; Ravichandra, 2008; Xu and Zhao,	Ab1	Ab1	Ab1

PEST	MODE OF PARASITISM	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
				CAN	USA	MEX
coespiticola maybe a variant spelling of species name]		*domestica*	2019			
Longidorus diadecturus Eveleigh and Allen	Root tip ectoparasite	*Prunus persica*	Eveleigh and Allen, 1982; Allen *et al.,* 1984	P2	P2	Ab1
Longidorus elongatus (de Man) Micoletzky	Root tip ectoparasite	*Malus domestica, Malus sylvestris, Prunus persica, Prunus communis*	Xu and Zhao, 2019	P7	P2	Ab1
Longidorus euonymus Mali and Hooper	Root tip ectoparasite	*Malus* spp., *Prunus armeniaca, Prunus* spp.	Liskova *et al.,* 2007; Lone *et al.,* 2018; Xu and Zhao, 2019	Ab1	Ab1	Ab1
Longidorus macrosoma Hopper	Root tip ectoparasite	*Prunus avium, Pyrus communis*	Andres *et al*., 1991; Arias and Andres, 1989; Raski, 1988; Xu and Zhao, 2019	Ab1	Ab1	Ab1
Longidorus mirus Khan, Chawla and Seshadri	Root tip ectoparasite	*Malus domestica*	Lone *et al.,* 2018	Ab1	Ab1	Ab1
Meloidogyne arenaria (Neal)	Sedentary endoparasite	*Prunus persica, Malus* spp.	Cid del Prado *et al.,* 2001; Hugo and Storey, 2017; Power *et al.,* 2005	P7	P2	P2
Meloidogyne floridensis Handoo, Nyczepir, Esmenjaud, van der Beek, Castognone-Sereno, Carta, Skantar and Higgins	Sedentary endoparasite	*Prunus persica*	Chitambar, 2018; Shirley, 2013	Ab1	P2	Ab1
Meloidogyne hapla Chitwood	Sedentary endoparasite	*Malus* spp., *Prunus armeniaca, Prunus domestica, Prunus persica*	Liskova *et al*., 2007; Ogawa *et al.,* 1995; Power *et al.,* 2005	P2	P2	P2
Meloidogyne incognita (Kofoid and White) Chitwood	Sedentary endoparasite	*Chaenomeles* spp., *Malus pumila, Prunus persica*	Maquilan *et al*., 2018; Ogawa *et al*., 1995; Powers *et al.,* 2005; Rumpunen, 2002; Khan *et al*., 2013	P2	P2	P2
Meloidogyne javanica (Treub) Chitwood	Sedentary endoparasite	*Cydonia oblonga, Prunus persica*	Cid del Prado *et al.,* 2001; Maquilan *et al*., 2018; Marais and Stwart, 1998; Ogawa *et al.,* 1995; Powers *et al.,* 2005	P7	P2	P2
Meloidogyne mali Itoh, Ohshima and Ichinoche	Sedentary endoparasite	*Malus* spp.	Bridge and Starr, 2007; Itoh *et al.*, 1969	Ab1	P2	Ab1
Merlinius brevidesn (Allen)	Root tip ectoparasite	*Prunus* spp.	Dong *et al*., 2007; MKenry and	P7	P2	Ab1

PEST	MODE OF PARASITISM	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
				CAN	USA	MEX
Siddiqi, syn. *Geocenamus brevidens* (Allen) Siddiqi			Roberts, 1985			
Mesocriconema curvatum (Raski) Loof and de Grisse (accepted name) syn. *Criconemella curvatum*	Ectoparasite	*Malus* spp., *Prunus persica*	Bridge and Starr, 2007; Hafez *et al.,* 1992	Ab1	P2	Ab1
Mesocriconema ornatum syn. *Criconemella ornata* (Raski) Luc and Raski, *Criconemella ornatum*	Ectoparasite	*Malus* spp.	Hafez *et al.,* 2010	Ab1	P2	Ab1
Mesocriconema xenoplax (Raski) Luc and Raski, syn. *Macroposthonia xenoplax* (Raski) De Grisse and Loof, *Criconemella xenoplax* (Raski) Luc and Raski	Ectoparasite	*Prunus persica*, *Prunus* spp.	Dong *et al.,* 2007; Ferris *et al.,* 2004; Ogawa *et al.,* 1995	P2	P2	P2
Nanidorus minor (Colbran) Siddiqi, syn. *Paratrichodorus minor, P. christiei, Trichodorus minor, Trichodorus christiei*	Root tip ectoparasite	*Cydonia oblonga, Malus domestica, Prunus persica, Pyrus* spp., *Pyrus communis*	Dong *et al.,* 2007; Hafez *et al*., 1992; Hugo and Storey, 2017; Kumari and Subbotin, 2012; Xu and Zhao, 2019	P7	P2	Ab1
Paratrichodorus lobatus (Colbran) Siddiqi, syn. *Trichodorus labatus* Colbran, *Trichodorus clarki* Yeates	Root tip ectoparasite	*Pyrus communis, Prunus persica, Prunus armeniaca*	Hugo and Storey, 2017	Ab1	Ab1	Ab1
Paratrichodorus pachydermus (Seinhorst) Siddiqi	Ectoparasite	*Malus* spp., *Prunus armeniaca, Prunus persica, Prunus cerasus, Prunus avium*	Kumari, 2010; Ravichandra, 2008	P7	P2	Ab1
Paratrichodorus porosus (Allen) Siddiqi, syn. *Trichodorus porosus* Allen	Root tip ectoparasite	*Malus domestica, Prunus pérsica, Prunus serrula, Pyrus* spp.	Hugo and Storey, 2017; Li *et al*., 2020; Siddiqui *et al*., 1973; Xu and Zhao, 2019	Ab1	P2	Ab1
Paratylenchus hamatus Thorne and Allen	Migratory endo and ectoparasite	*Malus* spp., *Prunus avium, Prunus persica*, *Prunus* spp., *Pyrus* sp..	Dong *et al.,* 2007; Raski, 1975; Ravichandra, 2008; Siddiqui *et al*., 1973; Van den Berg *et al.,* 2014	P2	P2	Ab1
Paratylenchus neglectus Filipjev and Schuurmans-Stekhoven	Migratory endo and ectoparasite	*Malus* spp., *Prunus avium*, *Prunus persica*, *Prunus* spp.	Carta *et al*., 2001; Hafez *et al.,* 2010; Siddiqui *et al*., 1973; Subbotin *et al*., 2008; Wang *et al.*, 2016	P2	P2	Ab1

PEST	MODE OF PARASITISM	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
				CAN	USA	MEX
Paratylenchus neoamblycephalus Geraert	Migratory endo and ectoparasite	*Prunus persica*	Dong *et al.*, 2001; McKenry and Roberts, 1985; Ravichandra, 2008	Ab1	P2	Ab1
Paratylenchus pratensis (de Man) Filipjev	Migratory endo and ectoparasite	*Malus* spp., *Prunus armeniaca, Prunus avium, Prunus persica, Prunus* spp.	Handoo and Morgan, 1989; Hugo and Storey, 2017; Liskova *et al.,* 2007	P7	P2	P2
Paratylenchus projectus Jenkins, [*Pratylenchus projectus* (Incorrect genus name)]	Migratory endo and ectoparasite	*Prunus armeniaca, Prunus avium, Prunus persica, Prunus* spp.	Liskova *et al.,* 2007; Siddiqui *et al.*, 1973 as cited in Chitambar *et al.,* 2012	P2	P2	Ab1
Pratylenchus brachyurus (Godfrey) Filipjev and Schuurmans Stekhoven	Migratory endo and ectoparasite	*Pyrus malus, Malus* spp., *Pyrus* spp., *Prunus* spp.	Cepeda and Hernández, 1991; Dong *et al.,* 2007; Jones and Aldwinckle, 1990; McKenry and Roberts, 1985; Oliveira *et al.,* 1999; Siddiqui *et al.,* 1973	Ab3	P2	P2
Pratylenchus coffeae (Zimmermann) Filipjev and Schuurmans Stekhovem	Migratory endo and ectoparasite	*Malus domestica*, *Malus* spp., *Pyrus* spp.	Hafez *et al*., 1992; Hafez *et al.,* 2010; Silva and Inomoto, 2002; Sutton *et. al*., 2014; Wang *et al*., 2016	Ab1	P2	Ab3
Pratylenchus crenatus Loof	Migratory endo and ectoparasite	*Malus* spp., *Prunus armeniaca*, *Prunus persica*	Brown *et al.,* 1980; Hafez *et al*., 2010; Liskova *et al*., 2007; Siddiqui *et al.,* 1973; Sutton *et al.*, 2013	P2	P2	Ab1
Pratylenchus penetrans (Cobb) Filipjev and Schuurmans-Stekhoven	Migratory endo and ectoparasite	*Cydonia oblongta, Malus domestica, Prunus armeniaca, Prunus persica, Prunus avium*	Carta *et al.,* 2001; Khan *et al.,* 2013; Liskova *et al*., 2007; Ogawa *et al*., 1995; Potter *et al*., 1984; Subbotin *et al.,* 2008; Villalobos *et al.,* 1980; Wang *et al.,* 2016;	P1	P2	Ab3
Pratylenchus scribneri Steiner	Migratory endo and ectoparasite	*Malus* spp.	Handoo and Morgan, 1989; Hugo and Storey, 2017	Ab1	P2	Ab3
Pratylenchus thornei Sher and Allen	Migratory endo and ectoparasite	*Malus domestica*, *Prunus armeniaca, Prunus persica*	Handoo and Morgan, 1989; Liskova *et al.,* 2007; Subbotin *et al*., 2008	P7	P2	P2
Pratylenchus vulnus Allen and Jensen	Migratory endo and ectoparasite	*Malus domestica, Prunus* spp., *Pyrus communis*	Chitambar and Raski, 1984; Handoo and Morgan, 1989; Hugo and Storey, 2017; Ogawa *et al*., 1995	Ab4	P2	Ab3
Pratylenchus zeae Graham	Migratory endo and	*Cydonia oblonga,*	Hugo and Storey, 2017; Marais	P7	P2	P2

PEST	MODE OF PARASITISM	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
				CAN	USA	MEX
	ectoparasite	*Pyrus communis*	and Swart, 1998			
Quinisulcius acutus (Allen) Siddiqi, syn. *Tylenchorhynchus acutus* Allen	Ectoparasite	*Malus* spp., *Prunus persica*	Siddiqui *et al.*, 1973; Hafez *et al.*, 2010	P7	P2	Ab1
Quinisulcius capitatus (Allen) Siddiqi, syn. *Tylenchorhynchus capitatus*	Ectoparasite	*Malus* spp., *Prunus* spp.	Siddiqui *et al.*, 1973	P7	P2	Ab3
Rotylenchus robustus (de Man) Filipev syn. *Rotylenchus fallorobustus* Sher	Semiendoparasite	*Malus* spp., *Prunus persica, Prunus* spp.	Cantalapiedra-Navarrete *et al.*, 2013; Dong *et al.,* 2007; Liskova *et al.,* 2007; Siddiqui *et al.*, 1973	P7	P2	Ab1
Scutellonema brachyurus (Steiner) Andrassy	Semiendoparasite	*Prunus persica, Prunus* spp.	Dong *et al.,* 2007	Ab1	P2	Ab1
Tylenchorhynchus annulatus (Cassidy) Golden	Ectoparasite	*Prunus* spp.	Dong *et al.,* 2007; Handoo and Morgan, 1989	Ab1	P2	Ab1
Tylenchorhynchus capitatus	Ectoparasite	*Malus domestica, Prunus* spp.	Allen, 1955; Siddiqui *et al*., 1973	P7	P3	Ab3
Tylenchorhynchus clarus Allen	Ectoparasite	*Prunus persica, Prunus* spp.	Handoo and Morgan, 1989; McKenry and Roberts, 1985; Siddiqui *et al*., 1973	Ab1	P2	Ab3
Tylenchorhynchus claytoni Steiner	Ectoparasite	*Malus* spp., *Prunus persica*	Siddiqui *et al.*, 1973	P2	P1	Ab3
Tylenchorhynchus cylindricus Cobb	Ectoparasite	*Malus domestica*, *Prunus armeniaca, Prunus persica, Prunus* spp.	Liskova *et al.,* 2007; Siddiqui *et al.*, 1973	Ab1	P2	Ab3
Tylenchorhynchus dubius Thorne	Ectoparasite	*Prunus* spp.	Siddiqui *et al.*, 1973	P2	P2	Ab1
Tylenchorhynchus ebriensis Seinhorst	Ectoparasite	*Prunus* spp.	Dong *et al.,* 2007	Ab1	P2	Ab1
Tylenchorhynchus maximus Allen	Ectoparasite	*Malus domestica, Prunus* spp.	Chitwood, 1953	P2	P2	Ab1
Tylenchorhynchus nudus	Ectoparasite	*Prunus* spp.	Dong *et al.,* 2007	P2	P2	Ab1
Xiphinema americanum Cobb	Root tip ectoparasite	*Prunus persica, Malus* spp.	Barsi, 1994; Lone *et al.,* 2018; Martínez, 1980; Ogawa *et al.,* 1995; Ramírez and Jiménez, 1987; Vrain and Rouselle, 1980; Weimin *et al.,* 2004; Xu and Zhao, 2019; Ye *et al.,* 2004;	P2	P1	Ab3
Xiphinema basiri Siddiqui	Root tip ectoparasite	*Malus domestica*	Lone *et al.,* 2018; Xu and Zhao,	Ab1	P2	Ab3

PEST	MODE OF PARASITISM	MAIN HOST(S)	REFERENCES	PRESENCE/ABSENCE		
				CAN	USA	MEX
			2019			
Xiphinema brevicolle Bordello and DaCosta	Root tip ectoparasite	*Malus pumila, Prunus armeniaca, Prunus persica, Prunus* spp., *Pyrus* spp.	Bridge and Starr, 2007; Oliveira *et al.,* 2004; Xu and Zhao, 2019	Ab1	P2	Ab1
Xiphinema bricolensis Ebsary, Vrain and Graham	Root tip ectoparasite	*Malus* spp., *Prunus* spp.	Ebsary *et al.,* 1989; Singh *et al.,* 2013; Robbins and Brown, 1991; Vrain and Rouselle, 1980	P2	P2	Ab1
Xiphinema californicum Lamberti and Bleve-Zacheo	Root tip ectoparasite	*Malus domestica, Prunus* spp.	Georgi, 1988; Bridge and Starr, 2007	Ab1	P2	Ab1
Xiphinema diffusum Lamberti and Bleve-Zecheo	Root tip ectoparasite	*Prunus persica*	Hugo and Storey, 2017; Oliveira *et al.,* 2004	Ab1	P2	Ab1
Xiphinema diversicaudatum (Micoletzky) Thorne	Root tip ectoparasite	*Malus* spp*., Prunus armeniaca*	Hugo and Storey, 2017; Lone *et al.,* 2018; Weimin *et al.,* 2004; Xu and Zhao, 2019; Ye *et al.,* 2004	P7	P2	Ab1
Xiphinema elongatum Schuurmans Stekhoven and Teunisse	Root tip ectoparasite	*Malus* spp., *Prunus avium, Pyrus communis*	Hugo and Storey, 2017; Lone *et al.,* 2018; Xu and Zhao, 2019	Ab1	P2	Ab1
Xiphinema index Thorne and Allen	Root tip ectoparasite	*Malus domestica, Prunus dulcis, Prunus persica, Pyrus malus*	Lone *et al.,* 2018; Téliz and Goheen, 1968; Weimin *et al.,* 2004; Xu and Zhao, 2019; Ye *et al.,* 2004	Ab1	P2	Ab3
Xiphinema insigne Loos	Root tip ectoparasite	*Malus* spp*., Prunus* spp.	Lambert *et al.,* 1997; Lone *et al.,* 2018; Luc and Southey, 1980	Ab1	P2	Ab1
Xiphinema mirus	Root tip ectoparasite	*Malus* spp., *Prunus* spp.	Lone *et al.,* 2018	Ab1	Ab1	Ab1
Xiphinema mluci Heyns	Root tip ectoparasite	*Malus* spp., *Prunus persica, Pyrus communis*	Hugo and Storey, 2017; Xu and Zhao, 2019	Ab1	Ab1	Ab1
Xiphinema occiduum	Root tip ectoparasite	*Malus domestica*	Ebsary *et al.,* 1984	P2	Ab1	Ab1
Xiphinema parvistillus Heyns	Root tip ectoparasite	*Malus domestica, Prunus persica*	Hugo and Storey, 2017; Xu and Zhao, 2019	Ab1	Ab1	Ab1
Xiphinema rivesi Dalmasso	Root tip ectoparasite	*Malus* spp., *Prunus persica*	Akinbade *et al*., 2014; Ebsary *et al.,* 1984; Georgi, 1988	P2	P2	Ab1
Xiphinema vuittenezi Luc, Lima, Weischer and Flegg	Root tip ectoparasite	*Malus domestica, Malus* spp., *Prunus armeniaca, Prunus avium, Prunus* spp., *Pyrus communis*	Bride and Starr, 2007; Weimin *et al.,* 2004; Xu and Zhao, 2019; Ye *et al.,* 2004	Ab1	P2	Ab1

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Annex 2: Grapevine Pests

LEGEND FOR SYMBOLS USED IN TABLES

Presence or absence unless otherwise noted conform to the categories listed in ISPM 8: 2021 (*Determination of pest status in an area)*. For ease of reference alphanumeric designations have been added here.

Ab1: Absent: pest not recorded
Ab2: Absent: the entire country is pest free
Ab3: Absent: pest records invalid
Ab4: Absent: pest no longer present
Ab5: Absent: pest eradicated

P1: Present: widely distributed
P2: Present: not widely distributed and not under official control
P3: Present: not widely distributed and under official control
P4: Present: at low prevalence
P5: Present: except in specified pest free areas
P6: Present: transient
P7: Present: not associated with host crop (NAPPO category)

Table 1: Virus pests of grapevine
Table 2: Fungal pathogens (incl. Chromista) of grapevine
Table 3. Bacterial pathogens of grapevine
Table 4: Nematode pests of grapevine

Table 1: Virus pests of grapevine

Viroid infections are ubiquitous throughout all grapevine growing regions of the world. All known viroids in grapevines are not known to cause any agronomic significant effects. Therefore, the viroids that are known to occur in the NAPPO region will not be included in this standard. Last updated December 2021.

PEST	ABBREVIATION	FAMILY	GENUS	REFERENCES	PRESENCE/ABSENCE		
					CAN	USA	MEX
Alfalfa mosaic virus	AMV	*Bromoviridae*	*Alfamovirus*	Meng *et al*., 2017	P7	P2	P2
Arabis mosaic virus	ArMV	*Secoviridae*	*Nepovirus*	MacKenzie *et al*., 1996; Meng *et al*., 2017	P2	P2	Ab3
Artichoke Italian latent virus	AILV	*Secoviridae*	*Nepovirus*	Jankulova *et al*., 1976; Meng *et al*., 2017	Ab1	Ab1	Ab1
Bean common mosaic virus	BCMV-PSt; peanut strain	*Potyviridae*	*Potyvirus*	Meng *et al*., 2017	Ab1	P2	Ab3
Blackberry virus S	BVS	*Tymoviridae*	*Marafivirus*	Meng *et al*., 2017	Ab1	P2	Ab1
Blueberry leaf mottle virus	BBLMV	*Secoviridae*	*Nepovirus*	Meng *et al*., 2017	P7	P2	Ab1
Broad bean wilt virus	BBWV	*Secoviridae*	*Fabavirus*	Basso *et al*., 2017; Castrovilli *et al*., 1985; Pearson, 1988	P7	P2	Ab1
Carnation mottle virus	CarMV	*Tombusviridae*	*Alphacarmovirus*	Basso *et al*., 2017; Wilcox, 2015	P7	P2	P2
Cherry leaf roll virus	CLRV	*Secoviridae*	*Nepovirus*	Basso *et al*., 2017	P7	P2	Ab1
Cucumber mosaic virus	CMV	*Bromoviridae*	*Cucumovirus*	Basso *et al*., 2017; Bovey, 1985	P7	P2	P2
Grapevine Ajinashika virus	GAgV	Unclassified	Unassigned	Meng *et al.,* 2017; Wilcox, 2015	Ab1	Ab1	Ab1
Grapevine Algerian latent virus	GALV	*Tombusviridae*	*Tombusvirus*	Basso *et al*., 2017; Meng *et al*., 2017	Ab1	Ab1	Ab1
Grapevine Anatolian ringspot virus	GARSV	*Secoviridae*	*Nepovirus*	Basso *et al*., 2017; Hajizadeh *et al*., 2012; Meng *et al*., 2017	Ab1	Ab1	Ab1
Grapevine angular mosaic virus	GAMoV	*Bromoviridae*	*Ilarvirus*	Basso *et al*., 2017; Girgis, *et al.,* 2009; Meng *et al.,* 2017	Ab1	Ab1	Ab1
Grapevine asteroid mosaic-associated virus	GAMaV	*Tymoviridae*	*Marafivirus*	Martelli, 2014; Xiao and Meng, 2016	P2	P2	Ab1
Grapevine berry	GINV	*Betaflexiviridae*	*Trichovirus*	Giampetruzzi *et al*., 2012;	Ab1	Ab1	Ab1

PEST	ABBREVIATION	FAMILY	GENUS	REFERENCES	PRESENCE/ABSENCE		
					CAN	USA	MEX
inner necrosis virus				Martelli, 2014; Meng *et al*., 2017			
Grapevine Bulgarian latent virus	GBLV	*Secoviridae*	*Nepovirus*	Meng *et al*., 2017; Uyemoto *et al.,* 1977	Ab1	Ab1	Ab1
Grapevine chrome mosaic virus	GCMV	*Secoviridae*	*Nepovirus*	Meng *et al.,* 2017	Ab1	Ab1	Ab1
Grapevine deformation virus	GDefV	*Secoviridae*	*Nepovirus*	Hajizadeh *et al*., 2012; Meng *et al*., 2017	Ab1	Ab1	Ab1
Grapevine enamovirus 1	GEV-1	*Luteoviridae*	*Enamovirus*	Silva *et al*., 2017	Ab1	Ab1	Ab1
Grapevine fabavirus		*Secoviridae*	Fabavirus	Al Rwahnih *et al.,* 2016b	Ab1	Ab1	Ab1
Grapevine fanleaf virus	GFLV	*Secoviridae*	*Nepovirus*	CISEH, 2018a; MacKenzie *et al.,* 1996; Meng *et al*., 2017; Wilcox, 2015	P2	P2	Ab1
Grapevine fleck virus	GFkV	*Tymoviridae*	*Maculavirus*	CISEH, 2018b; Kanuya, *et al*., 2012; Meng *et al*., 2017; Mikus and Goodman, 1999; Naidu and Mekuria, 2010; Poojari *et al.,* 2016	P2	P2	Ab1
Grapevine geminivirus A	GGVA	*Geminiviridae*	Unassigned	Al Rwahnih *et al*., 2016a	Ab1	P2	Ab1
Grapevine labile rod-shaped virus	GLRSV	Unclassified	Unassigned	Basso *et al*., 2017; Faggioli *et al.,* 1992	Ab1	Ab1	Ab1
Grapevine leafroll-associated virus 1	GLRaV-1	*Closteroviridae*	*Ampelovirus*	Borges *et al.,* 2020; Fuchs *et al*., 2009; Meng *et al*., 2017; MacKenzie *et al.,* 1996; Martin *et al.,* 2005; Sharma *et al*., 2011	P2	P2	Ab1
Grapevine leafroll-associated virus 2	GLRaV-2	*Closteroviridae*	*Closterovirus*	Meng *et al*., 2017; Fuchs *et al*., 2009; Martin *et al*., 2005; Borges *et al*., 2020; Sharma *et al.,* 2011	P2	P2	Ab1
Grapevine leafroll-associated virus 3	GLRaV-3	*Closteroviridae*	*Ampelovirus*	Borges *et al.,* 2020; Fuchs *et al*., 2009; Hoffman *et al*., 2020; MacKenzie *et al*., 1996; Martin *et al.,* 2005; Meng *et al*., 2017; Mikus and Goodman,	P2	P2	Ab1

PEST	ABBREVIATION	FAMILY	GENUS	REFERENCES	PRESENCE/ABSENCE		
					CAN	USA	MEX
				1999; Sharma *et al*., 2011			
Grapevine leafroll-associated virus 4	GLRaV-4	*Closteroviridae*	*Ampelovirus*	CISEH, 2018c; Sharma *et al*., 2011;Wilcox, 2015	P2	P2	Ab1
Grapevine leafroll-associated virus 7	GLRaV-7	*Closteroviridae*	*Velarivirus*	Al Rwahnih *et al*., 2012a; Morales and Monis, 2007; Wilcox, 2015	Ab1	P2	Ab1
Grapevine leafroll-associated virus 13	GLRaV-13	*Closteroviridae*	*Ampelovirus*	Ito and Nakaune, 2016	Ab1	Ab1	Ab1
Grapevine line pattern virus	GLPV	*Bromoviridae*	*Ilarvirus*	Wilcox, 2015	Ab1	Ab1	Ab1
Grapevine Pinot Gris virus	GPGV	*Betaflexiviridae*	*Trichovirus*	Al Rwahnih, 2016c; Giampetruzzi *et al*., 2012	P2	P2	Ab1
Grapevine red blotch virus	GRBV	*Geminiviridae*	*Grablovirus*	Al Rwahnih *et al.,* 2013; Wilcox, 2015	P2	P2	P2
Grapevine red globe virus	GRGV	*Tymoviridae*	*Maculavirus*	Wilcox, 2015	Ab1	Ab3	Ab1
Grapevine roditis leaf discoloration-associated virus	GRLDaV	*Caulimoviridae*	*Badnavirus*	Maliogka *et al*., 2015	Ab1	Ab1	Ab1
Grapevine rupestris vein feathering virus	GRVFV	*Tymoviridae*	*Marafivirus*	Chingandu *et al.,* 2020; Giampetruzzi *et al*., 2012; Xiao and Meng, 2016	P2	P2	Ab1
Grapevine rupestris stem pitting-associated virus	RSPaV	*Betaflexiviridae*	*Foveavirus*	Al Rwahnih *et al*., 2009; CISEH, 2018d; Martin *et al.,* 2005; Meng *et al*., 2017	P2	P2	Ab1
Grapevine Tunisian ringspot virus	GTRV	*Secoviridae*	*Nepovirus*	Basso *et al*., 2017; Quertani *et al*., 1992	Ab1	Ab1	Ab1
Grapevine stunt virus	GSV	Unclassified	Unassigned	Meng *et al*., 2017	Ab1	Ab1	Ab1
Grapevine vein-clearing virus	GVCV	*Caulimoviridae*	*Badnavirus*	Jones *et al*., 2015; Zhang *et al*., 2011	Ab1	P2	Ab1
Grapevine virus A	GVA	*Betaflexiviridae*	*Vitivirus*	CISEH, 2018e; Jones *et al*., 2015	P2	P2	Ab1
Grapevine virus B	GVB	*Betaflexiviridae*	*Vitivirus*	Basso *et al*., 2017; CISEH, 2018f	P2	P2	Ab1
Grapevine virus D	GVD	*Betaflexiviridae*	*Vitivirus*	Abou-Ghanem *et al*., 1997; Basso *et al*., 2017; CISEH, 2018g	Ab1	Ab3	Ab1

PEST	ABBREVIATION	FAMILY	GENUS	REFERENCES	PRESENCE/ABSENCE		
					CAN	USA	MEX
Grapevine virus E	GVE	*Betaflexiviridae*	*Vitivirus*	Alabi *et al*., 2013; Basso *et al*., 2017;	Ab1	P2	Ab1
Grapevine virus F	GVF	*Betaflexiviridae*	*Vitivirus*	Al Rwahnih *et al*., 2012b	Ab1	P2	Ab1
Grapevine virus G	GVG	*Betaflexiviridae*	*Vitivirus*	Blouin *et al*., 2018b; Diaz-Lara *et al*., 2019	Ab1	Ab1	Ab1
Grapevine virus H	GVH	*Betaflexiviridae*	*Vitivirus*	Candresse *et al*., 2018; Diaz-Lara *et al*., 2019	Ab1	Ab1	Ab1
Grapevine virus I	GVI	*Betaflexiviridae*	*Vitivirus*	Blouin *et al*., 2018a; Diaz-Lara *et al*., 2018; Diaz-Lara *et al*., 2019	Ab1	Ab1	Ab1
Grapevine virus J	GVJ	*Betaflexiviridae*	*Vitivirus*	Diaz-Lara *et al*., 2018	Ab1	Ab1	Ab1
Grapevine virus L	GVL	*Betaflexiviridae*	*Vitivirus*	Debat *et al*., 2019	Ab1	P2	Ab1
Grapevine virus M	GVM	*Betaflexiviridae*	*Vitivirus*	Alabi *et al*., 2019	Ab1	P2	Ab1
Grapevine virus T	GVT	*Betaflexiviridae*	*Foveavirus*	Glasa *et al*., 2018	Ab1	Ab1	Ab1
Grapevine Syrah virus-1	GSyV-1	*Tymoviridae*	*Marafivirus*	Al Rwahnih *et al*., 2009	P2	P2	Ab1
Peach rosette mosaic virus	PRMV	*Secoviridae*	*Nepovirus*	Meng *et al*., 2017	P7	P2	Ab1
Petunia asteroid mosaic virus	PAMV	*Tombusviridae*	*Tombusvirus*	Basso *et al*., 2017	P7	Ab1	Ab1
Potato virus X	PVX	*Alphaflexiviridae*	*Potexvirus*	Wilcox, 2015	P7	P2	Ab3
Raspberry bushy dwarf virus	RBDV	Unclassified	*Ideovirus*	Wilcox, 2015	P7	P2	Ab1
Raspberry ringspot virus	RpRSV	*Secoviridae*	*Nepovirus*	Martelli, 2014; Wilcox, 2015	Ab1	Ab1	Ab1
Sowbane mosaic virus	SoMV	*Solemoviridae*	*Sobemovirus*	Cesati and Van Regenmortel, 1969; Wilcox, 2015	P7	P2	Ab1
Strawberry latent ringspot virus	SLRSV	*Secoviridae*	Unassigned	Meng *et al.,* 2017	P7	P2	Ab3
Summer grape latent virus, syn. Grapevine Cabernet Sauvignon reovirus	SGLV; GCSV	*Reoviridae*	Unassigned	Meng *et al.,* 2017	Ab1	P2	Ab1
Tobacco mosaic virus	TMV	*Virgaviridae*	*Tobamovirus*	Wilcox, 2015	P7	P2	P2
Tobacco necrosis virus D	TNV-D	*Tombusviridae*	*Betanecrovirus*	Basso *et al*., 2017	P7	Ab1	Ab1
Tobacco ringspot	TRSV	*Secoviridae*	*Nepovirus*	Borges *et al*., 2020;	P7	P2	P2

PEST	ABBREVIATION	FAMILY	GENUS	REFERENCES	PRESENCE/ABSENCE		
					CAN	USA	MEX
virus				Meng *et al*., 2017			
Tomato black ring virus	TBRV	*Secoviridae*	*Nepovirus*	Meng *et al.,* 2017; Wilcox, 2015	P7	Ab1	Ab1
Tomato mosaic virus	ToMV	*Virgaviridae*	*Tobamovirus*	Basso *et al*., 2017	P7	P2	Ab3
Tomato ringspot virus	ToRSV	*Secoviridae*	*Nepovirus*	Borges *et al.,* 2020; Meng *et al.,* 2017; Wilcox, 2015;	P2	P2	Ab3

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Table 2: Fungal pathogens (incl. Chromista) of grapevine

Last updated December 2021.

PEST	DISEASE	REFERENCES	PRESENCE / ABSENCE		
			CAN	USA	MEX
Botryosphaeria dothidea (Moug.: Fr.) Ces. and De Not. Syn.: *Fusicoccum aesculi* Corda	Botryosphaeria dieback	Ammad *et al*., 2014; Smith and Stanosz, 2001; Wilcox *et al*., 2015	P2	P2	Ab3
Cadophora luteo-olivacea (J.F.H. Beyma) T.C. Harr. and McNew	Grapevine trunk disease	Gramaje *et al*., 2011; Navarrete *et al*., 2011; Raimondo *et al*., 2019; Travadon *et al*., 2015	P2	P2	Ab1
Colletotrichum acutatum J.H. Simmonds Syn.: *Glomerella acutata* Guerber and J.C. Correll	Anthracnose, bitter rot; blackspot	Haviland *et al*., 2019; Hong *et al.*, 2008; Wilcox *et al.*, 2015	P2	P2	P2
Coniella diplodiella (Speg.) Petr. and Syd. Syn.: *Coniothyrium diplodiella* (Speg.) Sacc., *Pilidiella diplodiella* (Speg.) Crous and Van Niekerk	Dieback, white rot	Blake and Williamson, 2015; Locci and Quaroni, 1972; Wilcox *et al.*, 2015	P2	P2	Ab1
Coniella vitis Chethana, J.Y. Yan, X.H. Li and K.D. Hyde	White rot	Chethana *et al.*, 2017	Ab1	Ab1	Ab1
Cryptovalsa ampelina (Nitschke) Fuckel	Dieback	Díaz *et al*., 2011; Luque *et al*., 2006; Trouillas and Gubler, 2010	P2	P2	Ab1
Cytospora chrysosperma (Pers.: Fr.) Fr. Syn.: *Valsa sordida* Nitschke	Perennial canker	Arzanlou and Narmani, 2015; Lawrence *et al*., 2018	P7	P2	Ab3
Cytospora vinacea D.P. Lawr., Travadon and Pouzoulet	Canker	Lawrence *et al*., 2017b	Ab1	P2	Ab1
Cytospora viticola D.P. Lawr., Travadon and Pouzoulet	Canker	Lawrence *et al*., 2017b; Oksal *et al.*, 2020	P2	P2	Ab1
Dactylonectria macrodidyma (Halleen, Schroers and Crous) L. Lombard and Crous, *Cylindrocarpon macrodidymum* Schroers, Halleen and Crous	Black foot	Petit *et al.*, 2011; Probst *et al.*, 2019; Úrbez-Torres *et al.*, 2012; Wilcox *et al.*, 2015	P2	P2	Ab1

PEST	DISEASE	REFERENCES	PRESENCE / ABSENCE		
			CAN	USA	MEX
Diaporthe ampelina (Berk and M.A. Curtis) R.R. Gomes, C. Glienke and Crous Syn.: *Phomopsis viticola* (Sacc.) Sacc.	Phomopsis cane and leaf spot	Chen *et al.*, 2014; Pscheidt and Ocamb, 2020; Wilcox *et al.*, 2015	P3	P2	Ab1
Diplodia corticola A.J.L. Phillips, A. Alves and J. Luque Syn.: *Botryosphaeria corticola* A.J.L. Phillips, A. Alves and J. Luque	Canker	Reed *et al*., 2018; Úrbez-Torres *et al.*, 2010b; Varela *et al.*, 2011	Ab1	P2	Ab3
Elsinoe ampelina Shear	Anthracnose	Santos *et al*., 2018; Wilcox *et al.*, 2015; Yun *et al.*, 2007	P2	P2	Ab3
Eutypa laevata (Nitschke) Sacc.	Eutypa dieback	Rolshausen *et al.*, 2014	P2	P2	Ab1
Eutypa leptoplaca (Mont.) Rappaz	Eutypa dieback	Pscheidt and Ocamb, 2020; Trouillas and Gubler, 2004; Trouillas and Gubler, 2010	Ab1	P2	Ab1
Ilyonectria destructans (Zinssm.) Rossman, L. Lombard and Crous Syn.: *Cylindrocarpon destructans* (Zinssm.) Scholten, *Neonectria radicicola* (Gerlach and L. Nilsson) Mantiri and Samuels	Black foot	Khorasani, 2013; Petit and Gubler, 2005; Pscheidt and Ocamb, 2020; Wilcox *et al.*, 2015	P2	P2	Ab3
Neofusicoccum luteum (Pennycook and Samuels) Crous, Slippers and A.J.L. Phillips Syn.: *Botryosphaeria lutea* A.J.L. Phillips	Canker and dieback	Chebil *et al.*, 2013; Savocchia *et al.*, 2007; Úrbez-Torres *et al.*, 2006	Ab1	P2	Ab3
Neofusicoccum mediterraneum Crous, M.J. Wingf. and A.J.L. Phillips	Cankers and dieback	Martin *et al.*, 2011; Úrbez-Torres *et al.*, 2010a; Varela *et al.*, 2011	Ab1	P2	Ab1
Neonectria obtusispora (Cooke and Harkn.) Rossman, L. Lombard and Crous Syn.: *Cylindrocarpon obtusisporum* (Cooke and Harkn.) Wollenw.	Black foot	Petit *et al.*, 2011; Pscheidt and Ocamb, 2020; Scheck *et al*., 1998a; Wilcox *et al.*, 2015	P7	P2	Ab1
Phaeoacremonium angustius W. Gams, Crous and M.J. Wingf.	Esca and Petri disease	Aroca and Raposo, 2009; Chicau *et al*., 2000	P2	P2	Ab1
Phaeoacremonium fraxinopennsylvanicum (T.E. Hinds) D. Gramaje, L. Mostert and Crous	Esca and Petri disease	Eskalen *et al.*, 2005	P2	P2	Ab1

PEST	DISEASE	REFERENCES	PRESENCE / ABSENCE		
			CAN	USA	MEX
Syn.: *Phaeoacremonium mortoniae* Crous and W. Gams, *Togninia fraxinopennsylvanica* (T.E. Hinds) Hausner, Eyjólfsdóttir and J. Reid					
Phaeoacremonium inflatipes W. Gams, Crous and M.J. Wingf.	Esca and Petri disease	Aroca and Raposo, 2009; Scheck *et al*., 1998b	Ab1	P2	Ab3
Phaeoacremonium krajdenii L. Mostert, Summerb. and Crous Syn.: *Togninia krajdenii* L. Mostert, W. Gams and Crous	Petri disease	Gramaje *et al.*, 2011a	Ab1	P2	Ab3
Phaeoacremonium minimum (Tul. and C. Tul.) D. Gramaje, L. Mostert and Crous Syn.: *Phaeoacremonium aleophilum* W. Gams, Crous, M.J. Wingf. and Mugnai, *Togninia minima* (Tul. and C. Tul.) Berl., *Togninia alnicola* (Ellis and Everh.) Berl.	Leaf stripe, Black measles	Haviland *et al.,* 2019a; Urbez-Torres *et al.*, 2012; Wilcox *et al.*, 2015	P2	P2	Ab1
Phaeoacremonium parasiticum (Ajello, Georg and C.J.K. Wang) W. Gams, Crous and M.J. Wingf. Syn.: *Phialophora parasitica* Ajello, Georg and Wang	Dieback	Aroca and Raposo, 2009; Groenewald *et al.,* 2001; OSU, 2020; Romero-Rivas *et al.*, 2009	Ab1	P2	Ab1
Phaeomoniella chlamydospora (W. Gams, Crous, M.J. Wingf. and Mugnai) Crous and W. Gams Syn.: *Phaeoacremonium chlamydosporum* W. Gams, Crous, M.J. Wingf. and Mugnai	Black measles	Haviland *et al.*, 2019a; *Scheck et al.*, 1998b; Wilcox *et al.*, 2015	P2	P2	Ab1
Phymatotrichopsis omnivora (Shear) Hennebert Syn.: *Phymatotrichum omnivorum* (Shear) Duggar	Texas root rot	Davis *et al.*, 2017; Smith, 2019; Wilcox *et al.*, 2015	Ab1	P2	Ab3
Phytophthora cinnamomi Rands	Phytophthora crown and root rot	Latorre *et al.*, 1997; Nouri *et al.*, 2017; Wilcox *et al.*, 2015	P7	P2	P2
Phytophthora citricola Sawada.	Root rot	Erwin and Ribeiro, 1996; Schwingle *et al.*, 2007	P7	P2	Ab3
Phytophthora cryptogea Pethybr. and Laff.	Phytophthora crown and root rot	Koike *et al.*, 2019; Latorre *et al.,* 1997; McKeever and Chastagner,	P7	P2	P2

PEST	DISEASE	REFERENCES	PRESENCE / ABSENCE		
			CAN	USA	MEX
		2016; Wilcox *et al.*, 2015			
Phytophthora drechsleri Tucker	Phytophthora crown and root rot	Latorre *et al.*, 1997; Olson and Benson, 2011; Olson *et al.*, 2016; Wilcox *et al.*, 2015	P7	P2	P2
Roesleria subterranea (Weinm.) Redhead	Grapevine root rot	EPPO, 2012; Miles and Schilder, 2009; Neuhauser *et al.*, 2011	P2	P2	Ab1
Rosellinia necatrix Prill. Syn.: *Dematophora necatrix* Hartig	Dematophora root rot	Mansoori and Dorostkar, 2008; Wilcox *et al.*, 2015; Windbiel-Rojas *et al.*, 2020	Ab1	P2	P2
Seimatosporium botan Sat. Hatak. and Y. Harada	Trunk canker	Díaz *et al.*, 2012; Díaz *et al.*, 2013; Lawrence *et al.*, 2017	Ab1	Ab1	Ab1
Verticillium dahliae Kleb.	Verticillium wilt	Gubler *et al.*, 2004; Wilcox *et al.*, 2015; Zhang *et al.*, 2009	P2	P2	P2

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Table 3. Bacterial pathogens of grapevine

Last updated December 2021.

PEST	DISEASE	REFERENCES	PRESENCE/ABSENCE		
			CAN	US	MEX
Candidatus Phytoplasma asteris Lee *et al*. (16SrI-A, -B, -C)	Grapevine yellows/aster yellows	Angelini *et al*., 2018; Davis *et al*., 2018	P2	P2	P2
Candidatus Phytoplasma aurantifolia (16SrII-B)	Grapevine yellows	Bertaccini, 2018	Ab1	Ab1	Ab3
Candidatus Phytoplasma australasia *(16SrII-A, -D)*	Australian grapevine yellows	Angelini, *et al.,* 2018; Bertaccini, 2018	Ab1	Ab1	~~P2~~
Candidatus Phytoplasma brasiliense (16SrXV-A)	Grapevine yellows	Bertaccini, A. 2018	Ab1	Ab1	Ab1
Candidatus Phytoplasma fraxini' Griffiths *et al*. (16SrVII-A)	Ash/elm yellows	Gajardo *et al*., 2009; Ghayeb Zamharir *et al*., 2017	P7	P2	Ab1
Candidatus Phytoplasma phoenicium (16SrIX,-B)	Grapevine yellows	Bertaccini, 2018	Ab1	Ab1	Ab1
Candidatus Phytoplasma prunorum (16SrX-B)	Grapevine yellows	Bertaccini, 2018	Ab1	Ab1	Ab1
Candidatus Phytoplasma pruni Davis *et al.* (16SrIII,-A)	Grapevine yellows	Davis *et al*., 2019	P7	P2	P2
Candidatus Phytoplasma solani' Quaglino *et al.* (16SrXII-A)	Grapevine yellows	Angelini *et al*., 2018; Landi *et al*.,2019	Ab5	Ab1	Ab1
Candidatus Phytoplasma trifolii Hiruki and Wang (16SrVI-A	Grapevine yellows	Bertaccini, 2018; Flower *et al*., 2017; Jacobs *et al.*, 2003	P7	P2	P2
Candidatus Phytoplasma ulmi (16SrV-A)	Grapevine yellows	Bertaccini, 2018	P7	Ab1	Ab1
Candidatus Phytoplasma vitis Marzorati *et al*. (16SrV-A, -B, -C, -D)	Flavescence dorée, Grapevine flavescence dorée, Palatinate grapevine yellows	Angelini *et al*., 2018; Eveillard *et al.*, 2016	Ab1	Ab1	Ab1
Pseudomonas syringae pv. *Syringae* Van Hall	Bacterial Inflorescence Rot	Hall *et al*. 2016	P7	P2	Ab3
Rhizobium vitis (Ophel and Kerr 1990) Young *et al*.; Syn.: *Agrobacterium vitis* (Ophel and Kerr)	Crown Gall	Kawaguchi *et al*., 2019; Voegel and Nelson, 2018	P2	P2	Ab3
Xanthomonas citri pv. *viticola* (Nayudu 1972) Dye, Syn.:	Bacterial Canker	Chand and Kishun, 1990; Naue *et al*., 2014	Ab1	Ab1	P2

PEST	DISEASE	REFERENCES	PRESENCE/ABSENCE		
			CAN	US	MEX
Xanthomonas campestris pv. *viticola* (Nayudu 1972) Dye					
Xylella fastidiosa Wells *et al.*	Pierce's Disease	Hill and Purcell, 1995, Kirkpatrick, B. C. 2015; Wilcox *et al*., 2015	P7	P2	P3
Xylophilus ampelinus (Panagopoulos Willems *et al.*)	Bacterial blight of grapevine, Canker of grapevine	Hand, F. P. 2015; Komatsu and Kondo, 2015; Soto-Giron *et al*., 2016; Wilcox *et al*., 2015	Ab1	P2	Ab1

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Table 4: Nematode pests of grapevine

Last updated December 2021.

PEST	MODE of PARASITISM	REFERENCES	PRESENCE/ABSENCE		
			CAN	USA	MEX
Gracilacus mirus n. sp.	Migratory endo and ectoparasite	Raski, 1962	Ab1	Ab1	Ab1
Helicotylenchus pseudorobustus (Steiner) Golden	Migratory ecto and semi endoparasite	Dong *et al.,* 2007; Esser, 1982; Ravichandra, 2008; Siddiqui *et al.,* 1973; Subbotin *et al.,* 2015	P7	P2	Ab1
Hemicriconemoides californianus Pinochet and Raski	Ectoparasite	Esser, 1982; Pinochet and Raski, 1975	Ab1	P2	Ab1
Hoplolaimus seinhorsti Luc	Migratory endo and ectoparasite	Brown, *et al*., 1993; Catalano *et al*., 1992	Ab1	P2	Ab1
Longidorus africanus Merny	Root tip ectoparasite	Andres *et al*., 1991; Raski, 1988, Wilcox *et al.*, 2015	Ab1	P2	Ab1
Longidorus attenuatus	Root tip ectoparasite	Arias and Andres, 1989; CABI 2021 edition; Griffiths and Robertson,1984; Raski, 1988	Ab1	Ab1	Ab1
Longidorus coespiticola Hooper. [*Longidorus coespiticola* (maybe a variant spelling of the species name)]	Root tip ectoparasite	Arias and Andres, 1989; Ravichandra, 2008	Ab1	Ab1	Ab1
Longidorus cretensis n.sp	Root tip ectoparasite	Tzortzakakis *et al.,* 2001	Ab1	Ab1	Ab1
Longidorus diadecturus Eveleigh and Allen	Root tip ectoparasite	Robbins and Brown, 1991	P2	P2	Ab1
Longidorus elongatus (deMan) Thorne and Swanger	Root tip ectoparasite	Arias and Andres, 1989; CABI 2021 edition; Griffiths and Robertson,1984; Raski, 1988	P7	P2	Ab1
Longidorus euonymus Mali and Hooper	Root tip ectoparasite	Barsi, 1994a; Choleva-Abadzhieva, 1975; Lone *et al.,* 2018	Ab1	Ab1	Ab1
Longidorus fasciatus Roca and Lamberti	Root tip ectoparasite	Brown *et al*.,1993; Brown *et al*., 1997	Ab1	Ab1	Ab1
Longidorus juvenilis Dalmasso	Root tip ectoparasite	Coiro *et al*., 1992; Kleynhans *et al*., 1966	Ab1	Ab1	Ab1
Longidorus macrosoma	Root tip ectoparasite	Andres *et al*.,1991; Arias and Andres, 1989;	Ab1	Ab1	Ab1

PEST	MODE of PARASITISM	REFERENCES	PRESENCE/ABSENCE		
			CAN	USA	MEX
Hooper		Raski, 1988			
Longidorus magnus Lamberti, Bleve-Zacheo and Arias	Root tip ectoparasite	Lamberti *et al*., 1982	Ab1	Ab1	Ab1
Meloidogyne arenaria (Neal) Chitwood	Sedentary endoparasite	CABI 2021 edition; Cid del Prado *et al.,* 2001. Hugo and Storey, 2017; Powers *et al*., 2005; Raski, 1988	P7	P2	P2
Meloidogyne hapla Chitwood	Sedentary endoparasite	CABI 2021 edition; Ogawa *et al.,* 1995; Powers *et al*., 2005; Raski, 1988	P1	P2	P2
Meloidogyne incognita (Kofoid) Chitwood, syn. *Meloidogyne acrita* Chitwood	Sedentary endoparasite	Martínez, 1989; Ogawa *et al.,* 1995; Powers *et al*., 2005; Raski, 1988	P7	P2	P2
Meloidogyne javanica (Treub) Chitwood	Sedentary endoparasite	Cid del Prado *et al.,* 2001; Ogawa *et al.,* 1995; Powers *et al*., 2005; Raski, 1988	P7	P2	P2
Meloidogyne mali Itoh, Ohshima and Ichinoe	Sedentary endoparasite	Bridge and Starr, 2007; Itoh *et al*., 1969	Ab1	P2	Ab1
Meloidogyne nataliei Golden, Rose and Bird	Sedentary endoparasite	Bird *et al*.,1994; Raski, 1988	Ab1	P2	Ab1
Merlinius brevidens [Allen] Siddiqi, syn. *Geocenamus brevidens* (Allen) Siddiqi, (*Geocenamous brevidens* (possibly misspelled (Allen) Brzeski) (accepted name)	Root tip ectoparasite	Dong *et al.,* 2007; Esser 1982; McKenry and Roberts, 1985	P7	P2	Ab1
Mesocriconema rusticum (Micoletzky) Loof and De Grisse, syn. *Macroposthonia rusticum*	Ectoparasite	Siddiqui *et al.,* 1973	Ab1	P2	Ab1
Mesocriconema xenoplax (Raski) Loof and De Grisse, syn. *Criconemoides xenoplax* Raski, *Macroposthonia xenoplax* (Raski) De Grisse and Loof, *Criconemella xenoplax* (Raski) Luc and	Ectoparasite	Dong *et al.,* 2007; Ferris *et al*., 2004; Ogawa *et al.,* 1995; Raski, 1952	P2	P2	P2

PEST	MODE of PARASITISM	REFERENCES	PRESENCE/ABSENCE		
			CAN	USA	MEX
Raski					
Paralongidorus maximus (Butschli) Siddiqi	Root tip ectoparasite	Mc Elroy *et al*., 1977	Ab1	Ab1	Ab1
Paratrichodorus pachydermus (Seinhorst) Siddiqi	Ectoparasite	Kumari, 2010; Ravichandra, 2008	P7	P2	Ab1
Pratylenchus brachyurus (Godfrey) Filipjev and Schuurn. Stekh.	Migratory endo and ectoparasite	Cepeda and Hernández, 1991; Dong *et al.,*2007; McKenry and Roberts, 1985; Oliveira *et al*., 1999; Siddiqui *et al.,* 1973	Ab3	P2	P2
Pratylenchus coffeae Zimmerman Filipjev and Schuurmans Stekhoven	Migratory endo and ectoparasite	Hafez *et al.,* 1992; Hafez *et al.,* 2010; Silva and Inomoto, 2002	Ab1	P2	Ab3
Pratylenchus crenatus Loof	Migratory endo and ectoparasite	Brown *et al*., 1980; Hafez *et al.,* 1992; Hafez *et al.,* 2010; Siddiqui *et al.,* 1973	P7	P2	Ab1
Paratylenchus hamatus Thorne and Allen	Migratory endo and ectoparasite	Dong *et al.,* 2007; Raski, 1952; Ravichandra, 2008; Siddiqui *et al.,* 1973; Van den Berg *et al.,* 2014	P7	P2	Ab1
Pratylenchus hexincisus Jenkins and Taylor	Migratory endo and ectoparasite	Carta *et al*., 2001; Dong *et al.,* 2007	P7	P2	Ab1
Pratylenchus neglectus (Rensch) Filipjev and S. Stekhoven	Migratory endo and ectoparasite	Carta *et al*., 2001; Hafez *et al.,* 1992; Hafez *et al.,* 2010; Siddiqui *et al.,* 1973; Subbotin *et al.,* 2008	P7	P2	Ab1
Paratylenchus neoamblycephanus	Migratory endo and ectoparasite	Dong *et al.,* 2007; McKenry and Roberts, 1985; Ravichandra, 2008	Ab1	P2	Ab1
Pratylenchus penetrans Cobb), Filipjev and Schwermans-Stekhoven	Migratory endo and ectoparasite	Carta *et al*., 2001; Ogawa *et al.,* 1995; Potter *et al*., 1984; Subbotin *et al.,* 2008; Villalobos *et al.,* 1980	P2	P2	Ab3
Pratylenchus pratensis (de Man) Filipjev	Migratory endo and ectoparasite	Handoo and Morgan, 1989. Hugo and Storey *et al*., 2017	P7	P7	Ab3
Pratylenchus vulnus Allen and Jensen	Migratory endo and ectoparasite	Chitambar and Raski, 1984; Handoo and Morgan, 1989; Storey *et al.*, 2017; Ogawa *et al.,* 1995	Ab4	P2	Ab3
Quinisulcius acutus (Allen) *Siddiqi (accepted name) syn. Tylenchorhynchus acutus* Allen	Ectoparasite	Siddiqui *et al.,* 1973	P7	P2	Ab1
Rotylenchulus reniformis	Semi endoparasite	Ravichandra, 2008	Ab1	P2	Ab1

PEST	MODE of PARASITISM	REFERENCES	PRESENCE/ABSENCE		
			CAN	USA	MEX
Linford and Oliveria					
Rotylenchulus robustus (de Man) Filip'ev syn. *Rotylenchus fallorobustus* Sher	Semi endoparasite	Cantalapiedra-Navarrete *et al.,* 2013; Dong *et al.,* 2007; Siddiqui *et al.,* 1973	P7	P2	Ab1
Tylenchorhynchus capitatus Allen	Ectoparasite	Allen, 1955; Siddiqui *et al.,* 1973	P7	P2	Ab3
Tylenchorhynchus clarus Allen	Ectoparasite	Handoo *et al.,* 2014; McKenry and Roberts, 1985; Siddiqui *et al.,* 1973	Ab1	P2	Ab3
Tylenchorhynchus claytoni Steiner	Ectoparasite	Siddiqui *et al.,* 1973	P2	P2	Ab3
Tylenchorhynchus cylindricus Cobb	Ectoparasite	Siddiqui *et al.,* 1973	Ab1	P2	Ab3
Tylenchorhynchus mashhood Siddiqi and Basir	Ectoparasite	Dong *et al.,* 2007	Ab1	P2	Ab1
Tylenchulus semipenetrans Cobb	Semi endoparasite	Dong *et al.,*2007; Edwards, M. 1988	Ab1	P2	P2
Xiphinema americanum Cobb	Root tip ectoparasite	Allen *et al.,* 1984; Ebsary *et al.,* 1984; Lone *et al.,* 2018; Ogawa *et al.,* 1995; Ramírez and Jiménez, 1987; Vrain and Rouselle, 1980; Weimin *et al*., 2004	P2	P2	P2
Xiphinema brevicolle Bordello and DaCosta	Root tip ectoparasite	Bridge and Starr, 2007; Olivera *et al*., 2004	Ab1	P2	Ab1
Xiphinema bricolensis Ebsary, Vrain and Graham	Root tip ectoparasite	Vrain, T. C. 1993	P2	P2	Ab1
Xiphinema browni Lazarova, Peneva and Kumari*, syn. Xiphinema mediterraneum* Martelli and Lamberti, *X. pachtaicum* (Tulaganov) Kirjanova	Root tip ectoparasite	Roca *et al*., 1991; Esser. 1982	Ab1	P2	Ab1
Xiphinema californicum Lamberti and Bleve-Zacheo	Root tip ectoparasite	Georgi, 1988, Bridge and Starr, 2007	Ab1	P2	Ab1
Xiphinema diversicaudatum (Micoletzky) Thorne	Root tip ectoparasite	Hugo and Storey, 2017; Lone *et al.,* 2018; Weimin *et al*., 2004	P7	P2	Ab1
Xiphinema index Thorne and Allen	Root tip ectoparasite	Lone *et al.,* 2018; Weimin *et al*., 2004; Téliz and Goheen, 1968	Ab1	P2	Ab3

PEST	MODE of PARASITISM	REFERENCES	PRESENCE/ABSENCE		
			CAN	USA	MEX
Xiphinema insigne Loos; *X. indicum* Siddiqi, syn. *X. neodimorphicaudatum* Khan, *X. tugewai* Darekar and Khan	Root tip ectoparasite	Lambert *et al*., 1997; Lone *et al.,* 2018; Luc and Southey, 1980	Ab1	P2	Ab1
Xiphinema italiae Meyl	Root tip ectoparasite	Weimin *et al*., 2004	Ab1	Ab1	Ab1
Xiphinema melitense n. sp.	Root tip ectoparasite	Roca *et al*., 1991	Ab1	Ab1	Ab1
Xiphinema monohysterum Brown	Root tip ectoparasite	McLeod and Khair, 1971	Ab1	Ab1	Ab1
Xiphinema occiduum n.sp.	Root tip ectoparasite	Ebsary *et al*.,1984	P2	Ab1	Ab1
Xiphinema pachtaicum Tulaganov	Root tip ectoparasite	Roca *et al*., 1991	Ab1	Ab1	Ab1
Xiphinema pacificum Ebsary, Vrain and Graham	Root tip ectoparasite	Vrain, T. C. 1993	P2	P2	Ab1
Xiphinema rivesi Dalmasso	Root tip ectoparasite	Akinbade *et al.,* 2014; Ebsary *et al.,* 1984; Georgi, 1988	P2	P2	Ab1
Xiphinema simile Lamberti, Choleva and Agostinelli	Root tip ectoparasite	Barsi, 1994	Ab1	Ab1	Ab1
Xiphinema taylori Lamberti, Ciancio, Agostinelli and Coiro	Root tip ectoparasite	Weimin *et al*., 2004	Ab1	Ab1	Ab1
Xiphinema vuittenezi Luc, Lima, Weischer and Flegg	Root tip ectoparasite	Bridge and Starr, 2007; Weimin *et al*., 2004	Ab1	P2	Ab1
Zygotylenchus guevarai Tobar Jiminez	Migratory endo and ectoparasite	Siddiqui, 1975	Ab1	Ab3	Ab1

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