Draft policy review
A categorisation of invertebrate and pathogen organisms associated with fresh table grape bunches (Vitis spp.) imported from other Australian states and territories

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Overview

Grape (Vitis spp.) fruit, seed and plant material have been prohibited entry into Western Australia from all sources for many years. The original prohibition was implemented due to concerns regarding phylloxera (Daktulosphaira vitifoli) and downy mildew (Plasmopara viticola). In 2008, Phomopsis viticola and grapevine fanleaf virus were identified as additional pests of concern and an alternative procedure under the Plant Diseases Act 1914 was adopted. This alternative procedure revoked the reference to downy mildew and included Phomopsis viticola and grapevine fanleaf virus as reasons for the restricted entry of grape fruit, seed and plants pending the outcome of a pest risk analysis. A regulation amendment was placed on hold pending the implementation of the Biosecurity and Agriculture Management Act 2007 (BAM Act) and relevant regulations.

Following the implementation of the BAM Act and Biosecurity and Agriculture Management Regulations 2013, downy mildew was declared by the Minister to be a permitted organism. Phylloxera, Phomopsis viticola and grapevine fanleaf virus were declared by the Minister to be prohibited organisms.

A formal pest risk analysis (PRA) for the importation of fresh table grape bunches has now commenced. A PRA is the mechanism by which the Department of Agriculture and Food, Western Australia's (DAFWA) Plant Biosecurity Policy Group considers biosecurity risks associated with the importation of fresh table grape bunches from other Australian states and territories.

The identification of pest invertebrate and pathogen organisms of quarantine concern for Western Australia has been undertaken via a pest categorisation process (this document). The pest categorisation process identifies pest invertebrate and pathogen organisms that are:

- absent from Western Australia
- associated with the table grape bunch pathway
- have potential to establish in Western Australia
- would be of economic concern should they establish in Western Australia.

The pest categorisation process has assessed 622 invertebrate and pathogen organisms associated with viticulture production in Australia.

This review has determined that 14 invertebrate (Table 2) and 13 pathogen organisms (Table 3) not present in Western Australia have the potential to be present on table grape bunches imported into Western Australia from other Australian states and territories. These 27 organisms also have the potential to establish in Western Australia and be of economic importance should they establish.

These 27 organisms satisfy the International Plant Protection Convention (IPPC) (FAO 1997) definition of a quarantine pest being:

‘A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled.’

The quarantine pest invertebrate (Table 2) and pathogen (Table 3) organisms recognised in this pest categorisation require further analysis via the risk assessment component of the PRA. The PRA will evaluate the quarantine pest risk profile and determine the requirement and extent of any phytosanitary measures necessary to provide the appropriate level of protection for Western Australia, without unduly restricting trade of table grape bunches in accordance with the Agreement on Sanitary and Phytosanitary Measures (SPS Agreement).
<table>
<thead>
<tr>
<th>Organism group</th>
<th>Associated with Australian viticulture</th>
<th>Absent from Western Australia or of regional concern</th>
<th>Potential presence on the tablegrape pathway</th>
<th>Potential to establish</th>
<th>Potential for economic consequences</th>
<th>Quarantine pest species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snails</td>
<td>5</td>
<td>0</td>
<td>Not assessed</td>
<td>Not assessed</td>
<td>Not assessed</td>
<td>0</td>
</tr>
<tr>
<td>Mites/spiders</td>
<td>56</td>
<td>12</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Insects</td>
<td>282</td>
<td>119</td>
<td>28</td>
<td>20</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Total invertebrates</td>
<td>343</td>
<td>131</td>
<td>33</td>
<td>24</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Bacteria &amp; Phytoplasmas</td>
<td>17</td>
<td>2</td>
<td>0</td>
<td>Not assessed</td>
<td>Not assessed</td>
<td>0</td>
</tr>
<tr>
<td>Fungi</td>
<td>168</td>
<td>68</td>
<td>23</td>
<td>19</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Nematodes</td>
<td>66</td>
<td>32</td>
<td>0</td>
<td>Not assessed</td>
<td>Not assessed</td>
<td>0</td>
</tr>
<tr>
<td>Protozoa</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>Not assessed</td>
<td>Not assessed</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^1\) Numbers include organisms with incomplete categorisation.
<table>
<thead>
<tr>
<th>Organism group</th>
<th>Associated with Australian viticulture</th>
<th>Absent from Western Australia or of regional concern</th>
<th>Potential presence on the tablegrape pathway</th>
<th>Potential to establish</th>
<th>Potential for economic consequences</th>
<th>Quarantine pest species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viruses &amp; Viroids</td>
<td>27</td>
<td>15</td>
<td>11</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Total pathogens</td>
<td>279</td>
<td>118</td>
<td>34</td>
<td>25</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Total organisms</td>
<td>622</td>
<td>249</td>
<td>67</td>
<td>49</td>
<td>27</td>
<td>27</td>
</tr>
</tbody>
</table>
Table 2 Quarantine pest invertebrates associated with fresh imported table grapes

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citrophilus mealybug</td>
<td><em>Pseudococcus calceolariae</em> (Maskell, 1897)</td>
</tr>
<tr>
<td>Citrus planthopper</td>
<td><em>Colgar peracutum</em> (Walker, 1858)</td>
</tr>
<tr>
<td>Crusader bug</td>
<td><em>Graptostethus</em> sp.</td>
</tr>
<tr>
<td>European fruit lecanium scale</td>
<td><em>Parthenolecanium corni corni</em> (Bouché, 1844)</td>
</tr>
<tr>
<td>European wasp</td>
<td><em>Vespula germanica</em> (Fabricus, 1793)</td>
</tr>
<tr>
<td>Flat grain beetle</td>
<td><em>Cryptolestes pusillus</em> (Schönherr 1878) BAMA (s22) declared pest</td>
</tr>
<tr>
<td>Grape phylloxera</td>
<td><em>Daktulosphaira vitifoliae</em> (Fitch, 1855)</td>
</tr>
<tr>
<td>Kanzawa spider mite</td>
<td><em>Tetranychus kanzawai</em> Kishida, 1927</td>
</tr>
<tr>
<td>Metallic shield bug</td>
<td><em>Scutiphora pedicellata</em> (Kirby, 1826)</td>
</tr>
<tr>
<td>Peach white scale</td>
<td><em>Pseudaulacaspis pentagona</em> (Targioni Tozzetti, 1886)</td>
</tr>
<tr>
<td>Queensland fruit fly</td>
<td><em>Bactrocera (Bactrocera) tryoni</em> (Froggatt, 1897)</td>
</tr>
<tr>
<td>Spanish red scale</td>
<td><em>Chrysomphalus dictyospermi</em> (Morgan, 1889)</td>
</tr>
<tr>
<td>Native tussock moth</td>
<td><em>Euproctis paradoxa</em> (Butler, 1886)</td>
</tr>
<tr>
<td>Warehouse beetle</td>
<td><em>Trogoderma variabile</em> Ballion 1878 BAMA (s22) declared pest</td>
</tr>
<tr>
<td>Common name</td>
<td>Scientific name</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Grapevine yellow speckle viroid 1</td>
<td>Apscaviroid Grapevine yellow speckle viroid (GYSVd) strain 1</td>
</tr>
<tr>
<td>Grapevine yellow speckle viroid 2</td>
<td>Apscaviroid Grapevine yellow speckle viroid (GYSVd) strain 2</td>
</tr>
<tr>
<td>-</td>
<td><em>Botryosphaeria iberica</em> A.J.L. Phillips, J. Luque &amp; A. Alves, 2005</td>
</tr>
<tr>
<td>-</td>
<td><em>Botryosphaeria sarmentosum</em> A.J.L. Phillips, J. Luque &amp; A. Alves, 2005</td>
</tr>
<tr>
<td>Sooty mould</td>
<td><em>Capnodium elongatum</em> Berk. &amp; Desm., 1849</td>
</tr>
<tr>
<td>Bitter rot</td>
<td><em>Greeneria uvicola</em> (Berk. &amp; M.A. Curtis) Punith. 1974</td>
</tr>
<tr>
<td>Hop stunt viroid</td>
<td>Hostuviroid Hop stunt viroid (HSVd)</td>
</tr>
<tr>
<td>Grapevine fanleaf virus</td>
<td>Nepovirus Grapevine fanleaf virus (GFLV)</td>
</tr>
<tr>
<td>-</td>
<td><em>Pestalotiopsis menezesiana</em> (Bres. &amp; Torrend) Bissett, 1983</td>
</tr>
<tr>
<td>-</td>
<td><em>Pestalotiopsis uvicola</em> (Speg.) Bissett 1983</td>
</tr>
<tr>
<td>Phomopsis cane and leaf spot</td>
<td><em>Phomopsis viticola</em> (Sacc.) Sacc., 1915</td>
</tr>
<tr>
<td>-</td>
<td><em>Pilidiella castaneicola</em> (Ellis &amp; Everh)</td>
</tr>
<tr>
<td>Citrus exocortis viroid</td>
<td>Posipiviroid Citrus exocortis viroid (CEVd)</td>
</tr>
</tbody>
</table>
Methodology

Introduction
The categorisation of invertebrate and pathogen species (candidate organism) is a component of the policy review for fresh table grape bunches imported into Western Australia from other states and territories. The categorisation of candidate organisms establishes the quarantine pest status for these organisms.

The methodology employed to determine quarantine pest status conforms to the International Standards for Phytosanitary Measures (ISPM) 2 Framework for Pest Risk Analysis and ISPM 11 Pest Risk Analysis of Quarantine Pests (FAO 2013). The methodology is also in accordance with the methodology outlined by the Australian Department of Agriculture’s predecessor Biosecurity Australia in the Guidelines for Import Risk Analysis (BA 2001).

The internationally accepted criteria of a quarantine pest species has been defined in the International Plant Protection Convention (FAO 1997) as:

‘A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled’, where:

- **Area** is defined as an ‘officially defined country, part of a country or all or parts of several countries’ (FAO 2010).
- **Potential economic importance** is determined by ‘clear indications that the pest is likely to have an unacceptable economic impact (including environmental impact) in the PRA area’ (FAO 2013).
- **Endangered area** is defined as ‘an area where ecological factors favour the establishment of a pest whose presence in the area will result in economically important loss’ (FAO 2010).

The categorisation of candidate organisms also establishes their association with table grape bunches.

Pest categorisation does not establish a risk profile for a quarantine pest species; this is undertaken in the risk assessment component of a pest risk analysis (PRA).

Determining an organism’s quarantine pest status

**Association with viticulture in Australia**
A list of candidate organisms associated with viticulture production is compiled based on information obtained from:

- organism lists provided by state/territory plant protection officers
- a review of Commonwealth\(^2\), scientific, industry and other literature
- a review of relevant internet sources

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\(^2\) Commonwealth import risk analyses are reviewed to identify pests that are present in Australia and associated with table grape bunches in other countries but not from Australian table grape bunches. Commonwealth publications reviewed include import risk analyses for table grapes from Chile (BA 2005), China (BA 2011a), Japan (ADoA 2014) and Korea (BA 2011b) and the USA (AQIS 1999; DAFF 2013).
a review of invertebrate and pathogen specimens residing in collections within Australia

seeking expert opinion.

The candidate organism lists include:

- A taxonomy review to establish the candidate organisms current accepted name.
- A verifying reference establishing the presence or absence of the candidate organism from an Australia state or territory.
- A verifying reference establishing the presence or absence of the candidate organism in Western Australia. A candidate organism that is present in Western Australia is ineligible for consideration as a ‘quarantine pest species’, unless under official control, and is not considered for further evaluation.

A list of candidate organisms associated with viticulture production in Australia is presented in Table 4 to Table 6 for invertebrate organisms and Table 9 to Table 13 for pathogen organisms.

Any candidate organisms not present in Western Australia are assessed further for any association with the table grape bunch pathway.

**Association with the table grape bunch pathway**

A candidate organism’s association with the table grape pathway is evaluated and presented in Table 7 (invertebrates) and in Table 14 (plant pathogens). This evaluation includes a brief referenced statement regarding the potential of the candidate organism’s association with the table grape pathway. Candidate organism’s are listed as having a ‘Likely’ or ‘Unlikely’ pathway association.

Candidate organisms having an unlikely pathway association are not considered further. An unlikely association with the table grape pathway would result in a ‘negligible’ likelihood of importation should the candidate organism be considered further in the PRA. Where a negligible likelihood occurs in a pest risk assessment, combining any other likelihood will result in a negligible overall probability of entry, establishment and spread. Combining a negligible overall probability of entry, establishment and spread with any estimate of economic impact would result in an unrestricted risk estimate not exceeding the appropriate level of protection (ALOP) of ‘very low’.

In some instances a candidate organism may be considered as having an unlikely pathway association if the pathway reference is very old and no recent records have been found, or where only single records for pathway associations were found.

Any candidate organisms not present in Western Australia and likely to be associated with the table grape bunch pathway are assessed further for their potential to establish and have an unacceptable economic impact (including environmental impact) in Western Australia.

**Potential to establish in Western Australia**

A candidate organism’s potential to establish within endangered areas in Western Australia is evaluated and presented in Table 8 (invertebrates) and in Table 15 (plant pathogens). An assumption is given that if a host plant is present in Western Australia then some potential exists for candidate organisms to establish within endangered areas in Western Australia. If the potential to establish within endangered areas in Western Australia is assessed to be ‘unlikely’ the candidate organism is not considered further.
**Potential economic importance**

A candidate organisms potential economic importance should it establish within endangered areas of Western Australia is evaluated and presented in Table 8 for invertebrate organisms and in Table 15 for pathogen organisms. If the potential economic importance should it establish within endangered areas in Western Australia is assessed to be ‘unlikely’ the candidate organism is not considered further.

**Final determination**

Any candidate organisms not meeting the criteria assessed in the pest categorisation phase are not considered a quarantine pest associated with the table grape pathway and are not evaluated further. Candidate species meeting all criteria for a quarantine pest are eligible for further evaluation through the pest risk assessment process and are presented in Table 2 for invertebrate organisms and Table 3 for pathogen organisms.

Once the quarantine pest status has been validated for a candidate species they undergo pest risk assessment and comparison with the Appropriate Level of Protection (ALOP). For organisms with an unrestricted risk exceeding the ALOP, DAFWA proposes phytosanitary measures that are the least restrictive to trade. This work is undertaken in the pest risk analysis report.
Pest categorisation of invertebrate organisms

Table 4 Snails and slugs associated with Australian viticulture

<table>
<thead>
<tr>
<th>Higher classification</th>
<th>Organism</th>
<th>Vitis spp. association</th>
<th>Australian distribution</th>
<th>Consider further (if yes go to Table 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stylommatophora:</td>
<td><em>Deroceras reticulatum</em> (Müller, 1774)</td>
<td>Kerruish 1997a</td>
<td>WA (ABRS 2013)</td>
<td>no</td>
</tr>
<tr>
<td>Agriolimacidae</td>
<td>reticulated slug</td>
<td></td>
<td>Qld (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NSW (ABRS 2013)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Vic. (ABRS 2013)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Tas. (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SA (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td>Stylommatophora:</td>
<td><em>Cornu aspersum</em> (Müller, 1774) also recorded as <em>Helix aspersa</em> and <em>Cantareus aspersa</em></td>
<td>Fisher &amp; Learmonth 2012</td>
<td>WA (ABRS 2013)</td>
<td>no</td>
</tr>
<tr>
<td>Helicidae</td>
<td>common garden snail</td>
<td></td>
<td>Qld (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NSW (ABRS 2013)</td>
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<td>Vic. (ABRS 2013)</td>
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<td>Tas. (ABRS 2013)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>SA (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td>Stylommatophora:</td>
<td><em>Cernuella (Cernuella) virgata</em> (Da Costa, 1778) also recorded as <em>Cernuella virgata</em></td>
<td>Furness 2003c</td>
<td>WA (ABRS 2013)</td>
<td>no</td>
</tr>
<tr>
<td>Helicidae</td>
<td>common white snail</td>
<td></td>
<td>Qld (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NSW (ABRS 2013)</td>
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<td>Vic. (ABRS 2013)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>SA (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td>Higher classification</td>
<td>Organism</td>
<td>Vitis spp. association</td>
<td>Australian distribution</td>
<td>Consider further (if yes go to Table 7)</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------</td>
<td>------------------------</td>
<td>-------------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Stylommatophora:</td>
<td><em>Prietocella barbara</em> (Linnaeus, 1785)</td>
<td>Furness 2003c</td>
<td>WA (ABRS 2013)</td>
<td>no</td>
</tr>
<tr>
<td>Helicidae</td>
<td>also recorded as <em>Cochlicella barbara</em> small conical snail</td>
<td></td>
<td>NSW (ABRS 2013)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vic. (ABRS 2013)</td>
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<td>Tas. (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SA (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td>Stylommatophora:</td>
<td><em>Theba pisana</em> (Müller, 1774) white Italian snail</td>
<td>Fisher &amp; Learmonth 2012</td>
<td>WA (ABRS 2013)</td>
<td>no</td>
</tr>
<tr>
<td>Helicidae</td>
<td></td>
<td></td>
<td>NSW (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Vic. (ABRS 2013)</td>
<td></td>
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<td>Tas. (ABRS 2013)</td>
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<td></td>
<td>SA (ABRS 2013)</td>
<td></td>
</tr>
<tr>
<td>Higher classification</td>
<td>Organism</td>
<td>Vitis spp. association</td>
<td>Australian distribution</td>
<td>Consider further (if yes go to Table 7)</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------</td>
<td>------------------------</td>
<td>-------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Araneae: Thomisidae</td>
<td>Misumena spp. crab spider</td>
<td>DAFF 2013</td>
<td>Aust (DAFF 2013)</td>
<td>yes</td>
</tr>
<tr>
<td>Mesostigmata: Phytoseiidae</td>
<td>Amblydromalus limonicus (Garman &amp; McGregor, 1956) also recorded as Amblyseius laiae &amp; Typhlodromalus laiae predatory mite</td>
<td>Whitney &amp; James 1996</td>
<td>WA (ASCU 2013) Queensland (UQIC 2013) New South Wales (ASCU 2013)</td>
<td>no</td>
</tr>
<tr>
<td>Mesostigmata: Phytoseiidae</td>
<td>Amblydromella applegum (Schicha, 1983) also recorded as Typhlodromus applegum predatory mite</td>
<td>Whitney &amp; James 1996</td>
<td>New South Wales (ASCU 2013)</td>
<td>yes</td>
</tr>
<tr>
<td>Mesostigmata: Phytoseiidae</td>
<td>Amblydromella brisbanensis (Schicha, 1979) also recorded as Typhlodromus brisbanensis predatory mite</td>
<td>ASCU 2013</td>
<td>Queensland (UQIC 2013) New South Wales (ASCU 2013)</td>
<td>yes</td>
</tr>
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### Table 5: Mites and spiders associated with Australian viticulture

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<td>Trombidiformes:</td>
<td><em>Oligonychus punicae</em></td>
<td>BA 2005</td>
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<td>Tetanychidae</td>
<td>avocado brown mite</td>
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<td>citrus red mite</td>
<td></td>
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## Table 5 Mites and spiders associated with Australian viticulture

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<th>Australian distribution</th>
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<td>Trombidiformes:</td>
<td><em>Panonychus ulmi</em> (Koch, 1835)</td>
<td>James &amp; Charles 2003</td>
<td>WA (ASCU 2013)</td>
<td>no</td>
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<td>Tetranychidae</td>
<td>European red mite</td>
<td></td>
<td>Qld (Thwaite 1991)</td>
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<td>Trombidiformes:</td>
<td><em>Petrobia latens</em> (Müller, 1776)</td>
<td>BA 2005</td>
<td>WA (Murray et al. 2013)</td>
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<td>Tetranychidae</td>
<td>brown wheat mite</td>
<td>ADoA 2014</td>
<td>Qld (Broadley 1982)</td>
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<td>Tas. (Miller 1966)</td>
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<td>Trombidiformes:</td>
<td><em>Tetranychus kanzawai</em> Kishida, 1927</td>
<td>BA 2011b</td>
<td>Qld (Gutierrez &amp; Schicha 1983)</td>
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<td>Tetranychidae</td>
<td>kanzawa spider mite</td>
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<td>NSW (Gutierrez &amp; Schicha 1983)</td>
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<td>Kondo 2004</td>
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<td>Trombidiformes:</td>
<td><em>Tetranychus lambi</em> Pritchard &amp; Baker, 1955</td>
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<td>banana spider mite</td>
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<td><em>Tetranychus neocaledonicus</em> (André, 1933) vegetable spider mite</td>
<td>UQIC 2013</td>
<td>WA (UQIC 2013), Qld (UQIC 2013), NSW (ASCU 2013), NT (NTEIC 2013)</td>
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### Table 6 Insects associated with Australian viticulture

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<tr>
<td>Coleoptera: Bostrichidae</td>
<td><em>Bostrychopsis jesuita</em> (Fabricius, 1755) large auger beetle</td>
<td>Goodwin et al. 2003</td>
<td>WA (ICDb 2013) Qld (QDPC 2013) NSW (ASCU 2013) Vic. (VAIC 2013) SA (WINC 2013) NT (NTEIC 2013)</td>
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<td>Coleoptera: Bostrichidae</td>
<td><em>Sinoxylon</em> sp. auger beetle</td>
<td>BA 2011a</td>
<td>WA (WACALM 2014) Qld (UQIC 2014) NSW (ASCU 2014) Tas. (TPPD 2014) SA (ANIC 2014) NT (NTEIC 2014)</td>
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<td>Coleoptera: Bostrichidae</td>
<td><em>Sinoxylon anae</em> Lesne, 1897 auger beetle</td>
<td>JD Swan 2011, pers. comm.</td>
<td>NT (NTEIC 2013)</td>
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<td>Coleoptera: Bostrichidae</td>
<td><em>Tristaria grousellei</em> Reitter, 1878</td>
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<td>WA (ANICDb 2013)</td>
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<td>Coleoptera: Bostrichidae</td>
<td><em>Xylobosca decisa</em> Lesne, 1906</td>
<td>ASCU 2013</td>
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<td>Coleoptera: Bostrichidae</td>
<td><em>Xylopsocus capucinus</em> (Fabricius, 1781) false powderpost beetle</td>
<td>ADoA 2014 Lesne 1924 cited in Fischer 1950; Woodruff et al. 2014</td>
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<td>Coleoptera: Bostrichidae</td>
<td><em>Xylothrips flavipes</em> (Illiger, 1801) auger beetle</td>
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<td>Coleoptera: Cantharidae</td>
<td><em>Chauliognathus lugubris</em> (Fabricius, 1801) also recorded as <em>Chauliognathus pulchellus</em> plague soldier beetle</td>
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<td>Coleoptera: Cerambycidae</td>
<td><em>Acalolepta mixta</em> (Hope, 1841) also recorded as <em>Acalolepta vastator</em> and <em>Monohammus mixus</em> fig longicorn</td>
<td>Goodwin et al. 2003</td>
<td>WA (ICDb 2013)</td>
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<td>Vic. (Goodwin et al. 1994)</td>
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<td>Coleoptera: Cerambycidae</td>
<td><em>Chlorophorus annulare</em> (Fabricius, 1787) bamboo longicorn beetle</td>
<td>Mattson et al. 2007</td>
<td>Qld (QDPC 2013)</td>
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<td>Coleoptera: Cerambycidae</td>
<td><em>Didymocantha obliqua</em> Newman, 1840</td>
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<td>Coleoptera: Cerambycidae</td>
<td><em>Penthea (Penthea) pardalis</em> (Newman, 1842)</td>
<td>ASCU 2013</td>
<td>WA (ICDb 2013)</td>
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Table 6 Insects associated with Australian viticulture

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<td>Coleoptera: Cerambycidae</td>
<td><em>Platyomopsis egena</em></td>
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<td><em>Altica gravida</em> (Blackburn, 1896) also recorded as <em>Haltica gravida</em> metallic flea beetle</td>
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<td><em>Arsipoda chrysis</em> (Olivier, 1808)</td>
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<td>Coleoptera: Chrysomelidae</td>
<td><em>Colaspoides foveiventris</em> Lea, 1915 lucerne leafeating beetle</td>
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<td>Coleoptera: Chrysomelidae</td>
<td><em>Colaspoides picticornis</em> Lea, 1915</td>
<td>QDPC 2013</td>
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<td>Coleoptera: Chrysomelidae</td>
<td><em>Monolepta australis</em> (Jacoby, 1882)</td>
<td>Kerruish 1997a</td>
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<td><em>Oulema (Oulema) rufotincta</em> (Clark, 1866)</td>
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<td>WA, Qld, NSW, Vic., NT</td>
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<td><em>Rhyparida dimidiata</em> Baly, 1861 sugarcane leaf beetle</td>
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<td><em>Scelodonta brevipilis</em> Lea, 1915</td>
<td>QDPC 2013</td>
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<td>Coleoptera: Chrysomelidae</td>
<td><em>Xanthogaleruca luteola</em> (Müller 1766) elm leaf beetle</td>
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<td>Coleoptera: Coccinellidae</td>
<td><em>Cryptolaemus montrouzieri montrouzieri</em> Mulsant, 1853</td>
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<td>striped ladybird beetle</td>
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<td><em>Rhizobius hirtellus</em> Crotch, 1874</td>
<td>Furness &amp; Charles 2003</td>
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<td><em>Stethorus</em> spp.</td>
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<td>WA (ICDb 2013)</td>
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<td><em>Ambrosiodmus rubricollis</em> Wood &amp; Bright, 1992</td>
<td>BA 2011b</td>
<td>WA absent</td>
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<td>Aust (Rabaglia et al. 2006 cited in ADoA 2014)</td>
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<td><em>Asynonychus cervinus</em> (Boheman, 1840)</td>
<td>TPPD 2013</td>
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<td>Coleoptera: Curculionidae</td>
<td><em>Atrichonotus minimus</em> Blanchard, 1851 also recorded as <em>Atrichonotus taeniátulus</em> small lucerne weevil</td>
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<td><em>Cryptolestes pusillus</em> (Schönherr 1878) flat grain beetle BAMA (s22) declared pest</td>
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<td><em>Dryocoetiops coffeae</em> (Eggers, 1923) bark beetle</td>
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<td><em>Ecrizothis inaequalis</em> Blackburn, 1899 gooseberry weevil</td>
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| Coleoptera: Curculionidae | *Ethemaia sellata* Pascoe, 1883  
  greybanded leaf weevil | ASCU 2013 | WA (ICDb 2013)  
  Qld (QDPC 2013)  
  NSW (ASCU 2013)  
  Vic. (VAIC 2013)  
  SA (WINC 2013) | no |
| Coleoptera: Curculionidae | *Graphognathus leucoloma* (Boheman)  
  also recorded as *Naupactus leucoloma*  
  whitefringed weevil | Sainty 1991 | WA (ICDb 2013)  
  Qld (QDPC 2013)  
  NSW (ASCU 2013)  
  Vic. (VAIC 2013)  
  Tas. (TPPD 2013)  
  SA (WINC 2013) | no |
| Coleoptera: Curculionidae | *Hypothenemus eruditus* Westwood, 1836  
  shot-hole wood borer | ADoA 2014  
  BA 2011a  
  BA 2011b  
  Mitchell & Maddox 2010 | Qld (QDPC 2014)  
  NSW (FCNI 2014) | yes |
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<td><em>Hypurus bertrandii</em> (Perris 1852)</td>
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<td><em>Orthorhinus cylindrirostris</em> Schoenherr, 1825</td>
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<td><em>Phlyctinus callosus</em> Schöenherr, 1834</td>
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<td>Coleoptera: Curculionidae</td>
<td><em>Steriphus caudatus</em> (Pascoe) spinetailed weevil</td>
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<td><em>Corticaria japonica</em> (Reitter)</td>
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<td>Aethina concolor (Macleay) hibiscus flower beetle</td>
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Table 6 Insects associated with Australian viticulture

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<td><em>Bactrocera (Bactrocera) aquilonis</em> (May, 1965)</td>
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<td><em>Bactrocera (Bactrocera) neohumeralis</em> (Hardy, 1951)</td>
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<td>Diptera: Tephritidae</td>
<td><em>Sphenella ruticeps</em> (Macquart, 1851) misidentified as <em>Sphenella marginate</em></td>
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<td><em>Aleurocanthus spiniferus</em> (Quaintance, 1903) spiny whitefly</td>
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<td><em>Aphis (Aphis) spiraecola</em> Patch, 1914 spiraea aphid</td>
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<td><em>Hyperomyzus (Hyperomyzus) lactucae</em> (Linnaeus, 1758) sowthistle aphid</td>
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<td><em>Macrosiphum (Macrosiphum) euphorbiae</em> (Thomas, 1878) potato aphid</td>
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<td><em>Myzus (Nectarosiphon) persicae</em> (Sulzer, 1776) green peach aphid</td>
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<td><em>Parthenolecanium corni corni</em> (Bouché, 1844)</td>
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<td><em>Parthenolecanium pruinum</em> (Coquillett, 1891) also recorded as <em>Eulecanium pruinum</em> frosted scale</td>
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<td>coon bug</td>
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<td><strong>Hemiptera: Lygaeidae</strong></td>
<td><em>Spilostethus decoratus</em> (Stål, 1866)</td>
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<td>milkweed bug</td>
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<td><em>Spilostethus hospes</em> (Fabricius, 1794) milkweed bug</td>
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<td>Hemiptera: Miridae</td>
<td><em>Campylomma liebknechti</em> (Girault, 1934) apple dimpling bug</td>
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<td><em>Coridromius sp.</em> <em>Coridromius variegatus</em> (Montrouzier, 1861) is monotypic and is present in WA.</td>
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<td><em>Icerya purchasi purchasi</em> Maskell, 1879</td>
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<td>Hemiptera: Monophlebidae</td>
<td><em>Icerya seychellarum seychellarum</em> (Westwood, 1855)</td>
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<td><em>Cermatulus nasalis</em> (Westwood, 1837) predatory shield bug</td>
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<td><em>Nezara viridula</em> (Linnaeus, 1758) green vegetable bug</td>
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<tr>
<td>Hemiptera: Phyloxeridae</td>
<td><em>Daktulosphaira vitifoliae</em> (Fitch, 1855) grape phylloxera</td>
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<td><em>Dysmicoccus brevipes</em> (Cockerell, 1893) pineapple mealybug</td>
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<td><em>Ferrisia virgata</em> (Cockerell, 1893) striped mealybug</td>
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<td><em>Geococcus coffeae</em> Green, 1933 coffee root mealybug</td>
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<td><em>Pseudococcus longispinus</em> (Targioni-Tozzetti, 1867)</td>
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<td><em>Dysdercus (Paradysdercus) sidae sidae</em> Montrouzier, 1861</td>
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<td>Hemiptera:</td>
<td><em>Lampronimera senator</em> (Fabricius, 1803)</td>
<td>JD Swan 2011, pers.</td>
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<td>Hemiptera: Scutelleridae</td>
<td><em>Scutiphora pedicellata</em> (Kirby, 1826) metallic shield bug</td>
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<td>Hymenoptera: Braconidae</td>
<td><em>Apanteles tasmanicus</em> Cameron, 1912 <em>as Dolichogenidea tasmanica</em> (Cameron, 1912) parasitic wasp</td>
<td>Bailey et al. 2003</td>
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<td><em>Anagyrus fusciventris</em> (Girault, 1915) parasitic wasp</td>
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<td>Hymenoptera: Encyrtidae</td>
<td><em>Metaphycus lounsburyi</em> (Howard, 1898) parasitic wasp</td>
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<td><em>Tetracnemoidea brevicornis</em> (Girault, 1915) parasitic wasp</td>
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<td>Hymenoptera: Vespidae</td>
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<td><em>Mastotermes darwiensis</em> Frogbatt, 1897</td>
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<td><em>Coptotermes acinaciformis acinaciformis</em> (Froggatt, 1898)</td>
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<td>Lepidoptera: Gelechiidae</td>
<td><em>Echiomima</em> sp.</td>
<td>Goodwin et al. 2003</td>
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<td>Lepidoptera: Lymantriidae</td>
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<td><em>Agarista agricola</em> Donovan, 1805</td>
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<td>Absent from WA - single record from 1954 painted vine moth</td>
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| Lepidoptera: Noctuidae | *Agrotis munda* Walker, 1857 pink cutworm | Fisher & Learmonth 2012 | WA (ICDb 2014)  
Qld (UQIC 2014)  
NSW (ASCU 2014)  
Vic. (VAIC 2014)  
Tas. (TPPD 2014)  
SA (WINC 2014)  
NT (NTEIC 2014) | no |
| Lepidoptera: Noctuidae | *Anomis flava* (Fabricius, 1775) cotton looper | ADoA 2014 | WA (ICDb 2014)  
NSW (ASCU 2014)  
NT (NTEIC 2014)  
Qld (QDPC 2014) | no |
| Lepidoptera: Noctuidae | *Arcte coerula* (Guenée, 1852) ramie moth | BA 2011b  
ADoA 2014 | WA Absent  
Aust. (Nielsen et al. 1996) | yes |
| Lepidoptera: Noctuidae | *Argyropleidia subaspersa* (Walker) | Common 1990 | Qld (Common 1990)  
NSW (Common 1990) | yes |
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<td><strong>Lepidoptera: Noctuidae</strong></td>
<td><em>Artena dotata</em> Fabricius, 1794 fruitpiercing moth</td>
<td>ADoA 2014 BA 2011a BA 2011b</td>
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<td><strong>Lepidoptera: Noctuidae</strong></td>
<td><em>Asteropetes noctuina</em> (Butler, 1878)</td>
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<td><em>Calyptro lata</em> (Butler, 1881)</td>
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<td><em>Calyptro thalictr</em> (Borkhausen, 1790) fruitpiercing moth</td>
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<td>WA Aust (BA 2011b)</td>
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<td>Lepidoptera: Noctuidae</td>
<td><em>Eudocima fullonia</em> (Clerck, 1764) fruitpiercing moth</td>
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<td><em>Ischyja manlia</em> (Cramer, 1776)</td>
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<td><em>Ophiusa tirhaca</em> (Cramer, 1777)</td>
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<td><em>Oraesia emarginata</em> Fabricius, 1794</td>
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<td><em>Dysgonia arctotaenia</em> (Guenée, 1852) recorded as <em>Parallelia arctotaenia</em> Guenée, 1852</td>
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<td><em>Phalaenoides glycinae</em> Lewin, 1805 grapevine moth</td>
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<td><em>Serrodes campana</em> Guenée, 1852 fruitpiercing moth</td>
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<td><em>Spodoptera exigua</em> (Hübner, 1808) lesser armyworm</td>
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<td><em>Spodoptera mauritia</em> (Boisduval, 1833) lawn armyworm</td>
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<td><em>Earias paralella</em> Lucas, 1898</td>
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<td><em>Papilio (Eleppone) anactus</em> Macleay, 1826 small citrus butterfly</td>
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<td>WA (Lindsay 1992)</td>
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<td><em>Clania variegata</em> (Snellen, 1879)</td>
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<td><em>Hyalarcta huebneri</em> (Westwood, 1855)</td>
<td>Hely et al. 1982</td>
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<td><em>Cadra cautella</em> (Walker, 1863)</td>
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<td>Lepidoptera: Pyralidae</td>
<td><em>Cadra figulilella</em> (Gregson, 1871)</td>
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<td><em>Diaphania indica</em> (Saunders, 1851) cucumber moth</td>
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<td><em>Diaphania indica</em> (Saunders, 1851) also recorded as <em>Palpita indica</em> Saunders, 1851</td>
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| **Lepidoptera: Pyralidae** | *Plodia interpunctella* (Hübner, 1813)  
Indian meal moth  
BAMA (s22) Declared Pest | Buchanan et al. 1984 | WA (ICDb 2014)  
Qld (QDPC 2014)  
NSW (ASCU 2014)  
Vic. (VAIC 2014)  
Tas. (TPPD 2014)  
SA (WINC 2014)  
NT (NTEIC 2014) | yes |
| **Lepidoptera: Sphingidae** | *Acosmeryx anceus* Stoll, 1871  
sphinx moth | Moulds 1981 | Qld (Common 1990)  
NSW (Common 1990) | yes |
| **Lepidoptera: Sphingidae** | *Agrius convolvuli* (Linnaeus, 1758)  
convolvulus hawk moth | BA 2011b  
ADoA 2014 | WA (ICDb 2014)  
Tas. (TPPD 2014)  
NT (NTEIC 2014) | no |
| **Lepidoptera: Sphingidae** | *Gnathothlibus erotus* (Cramer, 1777) | Moulds 1981 | WA (ICDb 2014)  
Qld (Common 1990)  
NSW (Common 1990)  
NT (NTEIC 2014) | no |
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<td><strong>Lepidoptera: Sphingidae</strong></td>
<td><em>Hyles livornicoides</em> (Lucas, 1892)</td>
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<td><strong>Lepidoptera: Sphingidae</strong></td>
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<td><em>Theretra oldenlandiae</em> (Fabricius, 1775)</td>
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<td>Lepidoptera: Tortricidae</td>
<td><em>Epiphyas postvittana</em> Walker, 1863</td>
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<td>orange fruit borer</td>
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<td><em>Chrysoperla</em> spp. Steinmann, 1964 green lacewing</td>
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<td><em>Gryllotalpa africana</em> Beauvois, 1805</td>
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<td>Orthoptera: Tettigoniidae</td>
<td><em>Ephippitytha maculata</em> Evans, 1847 (bush katydid)</td>
<td>ASCU 2014</td>
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<td>Thysanoptera: Phlaeothripidae</td>
<td><em>Haplothrips froggatti</em> Hood, 1918 black plague thrips</td>
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<td>Thysanoptera: Phlaeothripidae</td>
<td><em>Haplothrips victoriensis</em> Bagnall, 1918 tubular black thrips</td>
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<tr>
<td>Thysanoptera: Thripidae</td>
<td><em>Anaphothrips obscurus</em> (Müller, 1776) grass thrips</td>
<td>ADoA 2014</td>
<td>WA (ASCU 2014)</td>
<td>no</td>
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<td><strong>Thysanoptera: Thripidae</strong></td>
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<tr>
<td></td>
<td><em>Arorathrips mexicanus</em> (Crawford, 1909)</td>
<td>VAIC 2011</td>
<td>WA (ANIC 2014)</td>
<td>no</td>
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<td>Qld (QDPC 2014)</td>
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<td><strong>Thysanoptera: Thripidae</strong></td>
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<tr>
<td></td>
<td><em>Frankliniella occidentalis</em> (Pergande, 1865) western flower thrips</td>
<td>Furness 2003b</td>
<td>WA (ANIC 2014)</td>
<td>no</td>
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<td>Qld (QDPC 2014)</td>
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<td><strong>Thysanoptera: Thripidae</strong></td>
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<tr>
<td></td>
<td><em>Frankliniella schultzei</em> (Trybom, 1910) tomato thrips</td>
<td>ASCU 2014</td>
<td>WA (ICDb 2014)</td>
<td>no</td>
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### Table 6 Insects associated with Australian viticulture

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<tr>
<th>Higher classification</th>
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<th>Vitis spp. association</th>
<th>Australian distribution</th>
<th>Consider further (if yes go to Table 7)</th>
</tr>
</thead>
</table>
| **Thysanoptera: Thripidae** | *Heliothrips haemorrhoidalis* (Bouché, 1833)  
    greenhouse thrips | Hely et al. 1982 | WA (ASCU 2014)  
    Qld (QDPC 2014)  
    NSW (ASCU 2014)  
    Vic. (VAIC 2014)  
    Tas. (TPPD 2014)  
    SA (WINC 2014)  
    NT (NTEIC 2014) | no |
| **Thysanoptera: Thripidae** | *Hercinothrips femoralis* (Reuter, 1891)  
    banded greenhouse thrips | BA 2011b | WA (Galloway 1988)  
    Qld (QDPC 2014)  
    SA (WINC 2014) | no |
| **Thysanoptera: Thripidae** | *Scirtothrips dorsalis* Hood, 1919  
    chilli thrips | NTEIC 2014 | WA (L Halling 2011, pers. comm.)  
    Qld (QDPC 2014)  
    NSW (ANIC 2014)  
    NT (NTEIC 2014) | no |
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<tbody>
<tr>
<td>Thysanoptera: Thripidae</td>
<td><em>Selenothrips rubrocinctus</em> (Giard, 1901) redbanded thrips</td>
<td>QDPC 2014</td>
<td>WA (ANIC 2014) Qld (QDPC 2014) NSW (ASCU 2014) SA (ASCU 2014) NT (NTEIC 2014)</td>
<td>no</td>
</tr>
<tr>
<td>Thysanoptera: Thripidae</td>
<td><em>Thrips coloratus</em> Schmutz, 1913 loquat thrips</td>
<td>ADoA 2014</td>
<td>Qld (QDPC 2014) NT (NTEIC 2014)</td>
<td>yes</td>
</tr>
<tr>
<td>Thysanoptera: Thripidae</td>
<td><em>Thrips flavus</em> Schrank, 1776 honeysuckle thrips</td>
<td>ADoA 2014</td>
<td>NSW (ASCU 2014)</td>
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<tr>
<td>Thysanoptera: Thripidae</td>
<td><em>Thrips hawaiiensis</em> (Morgan 1913) banana flower thrips</td>
<td>BA 2011b</td>
<td>WA (ANIC 2014)</td>
<td>no</td>
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<td>ADoA 2014</td>
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<tr>
<td>Thysanoptera: Thripidae</td>
<td><em>Thrips imaginis</em> Bagnall, 1926 plague thrips</td>
<td>ASCU 2014</td>
<td>WA (ANIC 2014)</td>
<td>no</td>
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<td>Thysanoptera: Thripidae</td>
<td><em>Thrips tabaci</em> Lindeman, 1888 onion thrips</td>
<td>QDPC 2014</td>
<td>WA (ICDb 2014)</td>
<td>no</td>
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## Table 7 Invertebrates associated with the table grape bunch pathway

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<tr>
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<tbody>
<tr>
<td><em>Acizzia</em> sp.</td>
<td><strong>Unlikely:</strong> Hollis (2002) indicates that the superfamily Psylloidea are foliage feeders.</td>
<td>no</td>
</tr>
<tr>
<td><em>Acosmeryx aneus</em> Stoll, 1871 sphingid moth</td>
<td><strong>Unlikely:</strong> Moulds (1981) indicates that larval <em>A. aneus</em> feed on foliage.</td>
<td>no</td>
</tr>
<tr>
<td><em>Adelium tenebroides</em> Erichson, 1842</td>
<td><strong>Unlikely:</strong> Single record from <em>Vitis</em> ex VAIC (2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Aethina concolor</em> (Macleay) hibiscus flower beetle</td>
<td><strong>Unlikely:</strong> Ewing (2004) indicates that <em>A concolor</em> is normally found in association with flowers.</td>
<td>no</td>
</tr>
<tr>
<td><em>Agarista agricola</em> Donovan, 1805 painted vine moth</td>
<td><strong>Unlikely:</strong> McFarland (1980) indicates that <em>A. agricola</em> feed on foliage.</td>
<td>no</td>
</tr>
<tr>
<td><em>Agrypnus</em> sp.</td>
<td><strong>Unlikely:</strong> Single record from <em>Vitis</em> ex VAIC (2011).</td>
<td>no</td>
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</table>
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<tr>
<td><em>Aleurocanthus spiniferus</em> (Quaintance, 1903) spiny whitefly</td>
<td><strong>Unlikely:</strong> While this species attacks grapevine (Cioffi et al. 2013), it is not considered to be associated with fruit (ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td><em>Aleurodicus dispersus</em> Russell, 1965 spiraling whitefly</td>
<td><strong>Unlikely:</strong> Pawpaw is the only recognised fruit pathway for <em>A. dispersus</em> (Poole et al. 2009).</td>
<td>no</td>
</tr>
<tr>
<td><em>Altica gravida</em> (Blackburn, 1896) metallic flea beetle</td>
<td><strong>Unlikely:</strong> Adults feed on leaves and canes (Hely et al. 1982) larvae are also leaf feeders (Matthews &amp; Reid 2002).</td>
<td>no</td>
</tr>
<tr>
<td><em>Amblydromella applegum</em> (Schicha, 1983) predatory mite</td>
<td><strong>Unlikely:</strong> Recorded from leaf material. Whitney and James (1996) also indicates that <em>A. applegum</em> has an uncommon occurrence in Australian grapevines.</td>
<td>no</td>
</tr>
<tr>
<td><em>Amblydromella brisbanensis</em> (Schicha, 1979) predatory mite</td>
<td><strong>Unlikely:</strong> Recorded from leaf material. Whitney and James (1996) also indicates that <em>A. brisbanensis</em> has an uncommon occurrence in Australian grapevines.</td>
<td>no</td>
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<tr>
<td><em>Amblyseius herbicolus</em> (Chant, 1959)</td>
<td><strong>Unlikely:</strong> Recorded from leaf material. Whitney and James (1996) also indicates that <em>A. herbicolus</em> has an uncommon occurrence in Australian grapevines.</td>
<td>no</td>
</tr>
<tr>
<td>predatory mite</td>
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<tr>
<td><em>Amblyseius sturti</em> group</td>
<td><strong>Unlikely:</strong> ASCU (2011) has 3 records from <em>Vitis</em> leaf in 1993.</td>
<td>no</td>
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<tr>
<td>predatory mite</td>
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<tr>
<td><em>Amblyseius waltersi</em> Schicha, 1981</td>
<td><strong>Unlikely:</strong> Recorded from leaf material. Whitney and James (1996) also indicates that <em>A. waltersi</em> has an uncommon occurrence in Australian grapevines.</td>
<td>no</td>
</tr>
<tr>
<td>predatory mite</td>
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<tr>
<td><em>Ambrosiodmus rubricollis</em> Wood &amp; Bright, 1992</td>
<td><strong>Unlikely:</strong> Ambrosia beetles are wood borers and are not associated with fruit (Wood 1982; Coyle et al. 2005 cited in ADoA 2014).</td>
<td>no</td>
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<tr>
<td>bark beetle</td>
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<tr>
<td><em>Ametastegia (Ametastegia) glabrata</em> (Fallen, 1808) dock sawfly</td>
<td><strong>Unlikely:</strong> Primary host plant includes Rumex, Polygonum, Rheum. Reported from grapevine canes in Vicotira (Malipatil et al. 1995).</td>
<td>no</td>
</tr>
<tr>
<td><em>Anagyrus fusciventris</em> (Girault, 1915) parasitic wasp</td>
<td><strong>Likely:</strong> Furness and Charles (2003) indicates that <em>A. fusciventris</em> parasitises long-tailed and citrophilus mealybug which can be found in sheltered positions such as grape bunches.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Anoplognathus velutinus</em> Boisduval, 1835 christmas beetle</td>
<td><strong>Unlikely:</strong> Carne (1957) indicates that larvae are inhabit soil while the adults feed on foliage, although Hely et al. (1982) does reports that <em>Anoplognathus</em> spp. can sometimes damage plum fruit.</td>
<td>no</td>
</tr>
<tr>
<td><em>Aploneura ampelina</em> (Mokrzecky 1896)</td>
<td><strong>Unlikely:</strong> Blackman and Eastop (2000) indicates that <em>A. ampelina</em> is found underground feeding on roots or in leaf galls.</td>
<td>no</td>
</tr>
<tr>
<td><em>Apogonia</em> sp.</td>
<td><strong>Unlikely:</strong> Brown et al. (2000) indicated that NT <em>Apogonia</em> are leaf feeders.</td>
<td>no</td>
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<tr>
<td><em>Arcte coerula</em> (Guenée, 1852)</td>
<td><em>Unlikely:</em> Adults attack the fruit of grapevine (JSAE 1987; Zhang 1994 cited in BA 2011b), but feed only at night and are not associated with grapevine during the day (Hattori 1969; MAFF 2008a cited in BA 2011b).</td>
<td>no</td>
</tr>
<tr>
<td><em>Argyropleidia subaspersa</em> (Walker)</td>
<td><em>Not assessed</em></td>
<td>yes</td>
</tr>
<tr>
<td><em>Arsipoda chrysis</em> (Olivier, 1808)</td>
<td><em>Unlikely:</em> ABRS (2011) indicates that members of the Chrysomelid subfamily Galerucinae feed on leaves. Matthews and Reid (2002) indicates that <em>Arsipoda</em> larvae are unknown but are likely to be stem or root boring.</td>
<td>no</td>
</tr>
<tr>
<td><em>Artena dotata</em> Fabricius, 1794</td>
<td><em>Unlikely:</em> Adults feed on ripe grapes at night by piercing them and sucking their juices. They are not associated with grapes during daylight hours (Li 2004 cited in BA 2011a).</td>
<td>no</td>
</tr>
<tr>
<td><em>Asteropetes noctuina</em> (Butler, 1878)</td>
<td><em>Unlikely:</em> Larvae of this species feed only on leaves (USDA-APHIS 2002 cited in ADoA 2014)</td>
<td>no</td>
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<tr>
<td><strong>Attagenus (Attagenus) unicolor</strong> (Brahm, 1791) black carpet beetle</td>
<td><strong>Unlikely:</strong> Thompson (1983) indicates that <em>A. attagenus</em> is a pest of stored product and carpets.</td>
<td>no</td>
</tr>
<tr>
<td><strong>Australopsylla sp.</strong></td>
<td><strong>Unlikely:</strong> VAIC (2011) has single record from Vitis leaf in 1993.</td>
<td>no</td>
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<tr>
<td><strong>Axionicus insignis</strong> Pascoe, 1869 kurrajong weevil</td>
<td><strong>Unlikely:</strong> Both Milthorpe and Cunningham (2005) and Alipne Nurseries (2011) indicate that Kurrajong weevil (larvae) will only attack unhealthy trees.</td>
<td>no</td>
</tr>
<tr>
<td><strong>Bactrocera (Bactrocera) neohumeralis</strong> (Hardy, 1951) lesser Queensland fruit fly</td>
<td><strong>Unlikely:</strong> Single record of <em>B. neohumeralis</em> ex <em>Vitis labrusca</em> from (May 1960).</td>
<td>no</td>
</tr>
<tr>
<td><strong>Bactrocera (Bactrocera) tryoni</strong> (Froggatt, 1897) Queensland fruit fly</td>
<td><strong>Likely:</strong> Oag (2001) reports Qfly as a major pest of table grapes. Loch (2008) reports high levels damage to wine grapes.</td>
<td>yes</td>
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<td>Pathway association (presence on grape bunch)</td>
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<tr>
<td><em>Blastopsylla</em> sp.</td>
<td><strong>Unlikely:</strong> Hollis (2002) indicates that the Superfamily Psylloidea are foliage feeders.</td>
<td>no</td>
</tr>
<tr>
<td><em>Caedicia</em> spp.</td>
<td><strong>Unlikely:</strong> Furness (2003b) indicates that Nymphs feed in isolated patches from the upper leaf surface giving the leaves a lace-like appearance when severe. Older katydids chew large irregular holes.</td>
<td>no</td>
</tr>
<tr>
<td><em>Calyptera lata</em> (Butler, 1881)</td>
<td><strong>Unlikely:</strong> Adults attack grape berries (JSAE 1987; MAFF 2008a cited in ADoA 2014) but feed at night and are not associated with grapevine during the day (Hattori 1969 cited in ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td><em>Calyptera thalictri</em> (Borkhausen, 1790) fruitpiercing moth</td>
<td><strong>Unlikely:</strong> Adults attack grape berries (JSAE 1987; NPQS 2007a cited in ADoA 2014) but feed at night and are not associated with grapevine during the day (Hattori 1969 cited in ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td><em>Chlorophorus annulare</em> (Fabricius, 1787) bamboo longicorn beetle</td>
<td><strong>Unlikely:</strong> ‘The larvae of this species attack roots while adults feed on flowers. No records have been found which associate this species with fruit’ (ADoA 2014).</td>
<td>no</td>
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<tr>
<td><em>Chrysomphalus dictyospermi</em> (Morgan, 1889) Spanish red scale</td>
<td><strong>Likely:</strong> Affected plant parts are leaves especially, but sometimes on fruit and occasionally on branches (Watson 2005).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Chrysopa</em> spp. green lacewing</td>
<td><strong>Likely:</strong> Furness and Charles (2003) indicates that <em>Chrysopa</em> spp. parasitises long-tailed and citrophilus mealybug which can be found in sheltered positions such as grape bunches.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Chrysoperla</em> spp. Steinmann, 1964 green lacewing</td>
<td><strong>Likely:</strong> Recorded as a contaminant of table grapes in DAFF (2013).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Colaspoides foveiventris</em> Lea, 1915 lucerne leafeating beetle</td>
<td><strong>Unlikely:</strong> QDPIF (2011) has single record from <em>Vitis</em> in 1931.</td>
<td>no</td>
</tr>
<tr>
<td><em>Colaspoides picticornis</em> Lea, 1915</td>
<td><strong>Unlikely:</strong> QDPIF (2011) has single records from <em>Vitis</em> in 1931 and 1932.</td>
<td>no</td>
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### Table 7 Invertebrates associated with the table grape bunch pathway

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<tr>
<td><em>Colgar percutum</em> (Walker, 1858) citrus planthopper</td>
<td><strong>Likely:</strong> Smith et al. (1997) indicates that grapes are a host for <em>C. percutum</em> and that damage includes feeding marks.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Conoderus</em> sp.</td>
<td><strong>Unlikely:</strong> VAIC (2011) has single record from <em>Vitis</em> fruit and stem in 1995.</td>
<td>no</td>
</tr>
<tr>
<td><em>Corticaria japonica</em> (Reitter) minute mould beetle</td>
<td><strong>Unlikely:</strong> BA (2006) indicates that the beetles are orchard or packing house contaminants and are feeders on decaying plant material.</td>
<td>no</td>
</tr>
<tr>
<td><em>Cryptolestes pusillus</em> (Schönherr 1878) flat grain beetle</td>
<td><strong>Likely:</strong> Recorded as a contaminant of table grapes in DAFF (2013).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Daktulosphaira vitifoliae</em> (Fitch, 1855) grape phylloxera</td>
<td><strong>Likely:</strong> Buchanan et al. (2003) indicates that Phylloxera crawlers can be present on leaves and fruit of infested grapevines.</td>
<td>yes</td>
</tr>
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<tr>
<td><em>Diaspidiotus ancyclus</em> (Putnam, 1878)</td>
<td>Unlikely: This species is not associated with grape bunches (Ben-Dov 2012b cited in ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td>Putnam scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Diaspis boisduvalii</em> Signoret, 1869</td>
<td>Unlikely: Although a recognised as an important pest of orchid plants (Espinosa et al. 2010), very little information could be found regarding orchid scale’s association with <em>Vitis</em> sp. and no information could be found regarding any association with table grape bunches.</td>
<td>no</td>
</tr>
<tr>
<td>orchid scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Dieuches maculicollis</em> (Walker, 1872)</td>
<td>Unlikely: Reported as a ground dwelling species and associated with <em>Vitis</em> roots (ABRS 2009).</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Didymocantha obliqua</em> Newman, 1840</td>
<td>Unlikely: Lawrence and Britton (1991) indicates that adults feed on flowers, foliage or bark while larvae usually feed internally on bark, phloem, sapwood or hardwood.</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Diphucephala colaspidoides</em> (Gyllenhal, 1817)</td>
<td>Unlikely: Hely et al. (1982) indicates that swarming beetle feed on foliage.</td>
<td>no</td>
</tr>
<tr>
<td>green scarab beetle</td>
<td></td>
<td></td>
</tr>
<tr>
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</tr>
<tr>
<td><em>Diphucephala nigritarsis</em> Lea 1917 green scarab beetle</td>
<td><strong>Unlikely:</strong> Hely et al. (1982) indicates that swarming beetle feed on foliage.</td>
<td>no</td>
</tr>
<tr>
<td><em>Diphucephala nitidicollis</em> Macleay, 1886 green scarab beetle</td>
<td><strong>Unlikely:</strong> Hely et al. (1982) indicates that swarming beetle feed on foliage.</td>
<td>no</td>
</tr>
<tr>
<td><em>Diphucephala pulchella</em> Waterhouse, 1837 green scarab beetle</td>
<td><strong>Unlikely:</strong> Hely et al. (1982) indicates that swarming beetle feed on foliage.</td>
<td>no</td>
</tr>
<tr>
<td><em>Dolichogenidea tasmanica</em> (Cameron, 1912) parasitic wasp</td>
<td><strong>Likely:</strong> Baker et al. (2003) indicates that <em>D. tasmanica</em> parasitises light brown apple moth which can be found on foliage and bunches.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Dryocoetiops coffeae</em> (Eggers, 1923) bark beetle</td>
<td><strong>Unlikely:</strong> Scolytine beetles are associated with woody plant products (Luo et al. 2005 cited inBA 2011a). They are unlikely to be on the pathway (BA 2011a).</td>
<td>no</td>
</tr>
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<tr>
<td><em>Duplaspidiotus claviger</em> (Cockerell, 1901) dupla scale</td>
<td><strong>Unlikely:</strong> Brimblecombe (1962a) indicates that <em>D. claviger</em> is found on the woody portions of grapevines.</td>
<td>no</td>
</tr>
<tr>
<td><em>Echiomima</em> sp. vine borer moth</td>
<td><strong>Unlikely:</strong> Goodwin et al. (2003) indicates that <em>Echiomina</em> sp. larvae tunnel into canes and spurs while nocturnally feeding on bark.</td>
<td>no</td>
</tr>
<tr>
<td><em>Echnolagria</em> sp.</td>
<td><strong>Unlikely:</strong> TPPD (2011) has single record from <em>Vitis</em> in 2002.</td>
<td>no</td>
</tr>
<tr>
<td><em>Ecrizothis inaequalis</em> Blackburn, 1899 gooseberry weevil</td>
<td><strong>Unlikely:</strong> Kerruish (1997a) indicates that <em>E. inaequalis</em> feeds on foliage and buds.</td>
<td>no</td>
</tr>
<tr>
<td><em>Ephippitytha maculata</em> Evans, 1847 bush katydid</td>
<td><strong>Likely:</strong> Rentz (1996) indicates that bush katydids can feed on leaves, flowers, and fruit.</td>
<td>yes</td>
</tr>
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<tr>
<td><em>Eristalinus (Lathyrophthalmus) aeneus</em> (Scopoli, 1763) hover fly</td>
<td><strong>Likely:</strong> Recorded as a contaminant of table grapes in DAFF (2013).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Erythroneura</em> spp. Fitch, 1851 leafhopper</td>
<td><strong>Unlikely:</strong> The genus does not validly occur in the Australian region (ABRS 2009).</td>
<td>no</td>
</tr>
<tr>
<td><em>Euproctis paradoxa</em> (Butler, 1886) tussock moth</td>
<td><strong>Likely:</strong> Hely et al. (1982) indicates that indicate that the larvae can graze fruit near stem.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Geococcus coffeae</em> Green, 1933 coffee root mealybug</td>
<td><strong>Unlikely:</strong> Ben-Dov et al. (2010) indicates that <em>G. coffeae</em> occurs on the roots of its host plants.</td>
<td>no</td>
</tr>
<tr>
<td><em>Geoica lucifuga</em> (Zehntner, 1897) sugarcane root aphid</td>
<td><strong>Unlikely:</strong> Blackman and Eastop (2000) indicates that <em>G. lucifuga</em> occurs on the roots of its host plants.</td>
<td>no</td>
</tr>
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<tr>
<td><em>Graptostethus</em> sp. crusader bug</td>
<td><strong>Likely:</strong> Chin et al. (2009) indicates that <em>Graptostethus</em> sp. can cause mechanical damage to fruit.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Hypothenemus eruditus</em> shot-hole wood borer</td>
<td><strong>Unlikely:</strong> No records have been found which associate this species with fruit (ADoA 2014). Scolytine beetles are associated with woody plant products (Luo et al. 2005 cited in BA 2011a). They are unlikely to be on the pathway (BA 2011a).</td>
<td>no</td>
</tr>
<tr>
<td><em>Hypurus bertrandii</em> (Perris 1852) portulaca leafmining weevil</td>
<td><strong>Unlikely:</strong> DAFF (2013) reports no evidence of an association with <em>Vitis vinifera</em>.</td>
<td>no</td>
</tr>
<tr>
<td><em>Ischyja manlia</em> (Cramer, 1776) fruitpiercing moth</td>
<td><strong>Unlikely:</strong> This species feeds on grapevine at night (Walker 2007a cited in BA 2011b) and shelters in leaves during the day (Li 2004 cited in BA 2011b). This species would not be associated with grapevine during the day (Hattori 1969 cited in BA 2011b).</td>
<td>no</td>
</tr>
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<tr>
<td><em>Leptopius robustus</em> (Boheman)</td>
<td><strong>Unlikely:</strong> Anon (1939) indicates that <em>L. robustus</em> usually infests weakened trees with adults feeding on leaves while larvae are soil dwelling feeding on roots.</td>
<td>no</td>
</tr>
<tr>
<td>fruit tree root weevil</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Leptopius squalidus</em> Boheman</td>
<td><strong>Unlikely:</strong> Hely et al. (1982) indicates that indicate that the larvae feed on roots while the adults can feed on leaves.</td>
<td>no</td>
</tr>
<tr>
<td>fruit tree root weevil</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Lopholeucaspis japonica</em> (Cockerell, 1897)</td>
<td><strong>Likely:</strong> Although <em>L. japonica</em> is associated with the leaves and bark of the host and sometimes on fruits (CABI/EPPO 1997), the Australian distribution appears to be based on early 1900’s records. No recent records for the presence of <em>L. japonica</em> in Australia could be found.</td>
<td>no</td>
</tr>
<tr>
<td>Japanese baton scale; pear white scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Mandalotus</em> sp.</td>
<td><strong>Unlikely:</strong> Rarely collected from <em>Vitis</em>, CESAR Consultants (2007) indicate that adults are leaf feeders while larvae are soil dwellers feeding on root material.</td>
<td>no</td>
</tr>
<tr>
<td>mandalotus weevil</td>
<td></td>
<td></td>
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<tr>
<td><em>Melampsalta</em> sp. black cicada</td>
<td><strong>Unlikely:</strong> Greenup (1967) reports oviposition damage to wood.</td>
<td>no</td>
</tr>
<tr>
<td><em>Metaphycus lounsberryi</em> (Howard, 1898) parasitic wasp</td>
<td><strong>Unlikely:</strong> Furness (2003) indicates that <em>M. lounsberryi</em> parasitised grapevine scale <em>Parthenolecanium persicae persicae</em>, which can be found on canes and the bark of older wood in spring. Small yellow crawler scales are present on leaves in summer.</td>
<td>no</td>
</tr>
<tr>
<td><em>Misumena</em> spp. crab spider</td>
<td><strong>Likely:</strong> Recorded as a contaminant of table grapes in DAFF (2013).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Monolepta divisa</em> Blackburn, 1888 small monolepta beetle</td>
<td><strong>Unlikely:</strong> Hely et al. (1982) indicates that swarming beetles feed on young foliage and green fruit.</td>
<td>no</td>
</tr>
<tr>
<td>Organism</td>
<td>Pathway association (presence on grape bunch)</td>
<td>Consider further (if yes go to Table 8)</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>Neoseiulus loxtoni (Schicha, 1979)</td>
<td><em>Unlikely:</em> James and Whitney (1991) indicates that <em>N. loxtoni</em> can be found on dormant vines and leaves of actively growing vines.</td>
<td>no</td>
</tr>
<tr>
<td>Neoseiulus nosae (McMurtry &amp; Schicha, 1987)</td>
<td><em>Unlikely:</em> Recorded from leaf material. Whitney and James (1996) also indicates that <em>N. nosae</em> has an uncommon occurrence in Australian grapevines.</td>
<td>no</td>
</tr>
<tr>
<td>Neoseiulus thwaitei (Schicha, 1977)</td>
<td><em>Unlikely:</em> Whitney and James (1996) indicates that <em>N. thwaitei</em> has an uncommon occurrence in Australian grapevines.</td>
<td>no</td>
</tr>
<tr>
<td>Notiosomus sp.</td>
<td><em>Unlikely:</em> ICDb (2011) has single record from Vitis in 1959.</td>
<td>no</td>
</tr>
<tr>
<td>Oligonychus punicae (Hirst, 1926)</td>
<td><em>Unlikely:</em> <em>Oligonychus punicae</em> feeds on leaves (Vasquez et al. 2008 cited in BA 2011a).</td>
<td>no</td>
</tr>
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<tbody>
<tr>
<td><em>Oraesia emarginata</em> (Fabricius, 1794) fruitpiercing moth</td>
<td><strong>Unlikely:</strong> This species is a nocturnal fruit-piercing moth. As with other fruit-piercing noctuid moths, adults shelter in foliage during the day (Li 2004 cited in BA 2011a).</td>
<td>no</td>
</tr>
<tr>
<td><em>Orthorhinus klugi</em> Boheman vine weevil</td>
<td><strong>Unlikely:</strong> Hely et al. (1982) indicates that only wood is attacked.</td>
<td>no</td>
</tr>
<tr>
<td><em>Oryzaephilus surinamensis</em> (Linnaeus, 1758) saw toothed grain beetle</td>
<td><strong>Unlikely:</strong> Saw toothed grain beetle can be a pest of dried sultana production (Buchanan et al. 1984).</td>
<td>no</td>
</tr>
<tr>
<td>BAMA (s22) Declared Pest</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Otiorhynchus (Zustalestus) rugosostriatus</em> (Goeze 1777) rough strawberry weevil</td>
<td><strong>Unlikely:</strong> Larvae feed on roots and adults feed on leaves throughout the summer and are nocturnal. Overwintering occurs as fully-grown larvae, pupae or adults, in the topsoil or soil debris (BA 2005).</td>
<td>no</td>
</tr>
</tbody>
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<tr>
<td><em>Otiorhynchus sulcatus</em> (Fabricius, 1775)</td>
<td><strong>Unlikely:</strong> Adults nocturnally feed on buds, foliage, flowers, and the cluster rachis. Larvae feed on roots (Kerruish 1997b; Bentley et al. 2014).</td>
<td>no</td>
</tr>
<tr>
<td>Black vine weevil</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ozolius pitta</em> Löcker, 2006</td>
<td><strong>Not assessed</strong></td>
<td>yes</td>
</tr>
<tr>
<td><em>Panonychus citri</em> (McGregor, 1916)</td>
<td><strong>Unlikely:</strong> Although this species attacks grapevine (Wu and Lo 1989; Migeon and Dorkeld 2012 cited in ADoA 2014), feeding occurs on leaves (Jeppson et al. 1975 cited in ADoA 2014). No records have been found which associate this species with fruit (ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td>Citrus red mite</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Parallelia arctotaenia</em> Guenée, 1852</td>
<td><strong>Unlikely:</strong> Adults of this species attack grape berries (JSAE 1987 cited in ADoA 2014). However, they feed only at night and are not associated with grapevine during the day (Hattori 1969 cited in ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td><em>Parlatoria camelliae</em> Comstock, 1883</td>
<td><strong>Unlikely:</strong> Infestations were reported to be limited to the leaves of host plants (Miller &amp; Davidson 2005).</td>
<td>no</td>
</tr>
<tr>
<td>Camellia parlatoria scale</td>
<td></td>
<td></td>
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<tr>
<td><em>Parthenolecanium corni corni</em> (Bouché, 1844)</td>
<td>Likely: <em>P. corni corni</em> is a pest of <em>Vitis vinifera</em> (Ben-Dov 2014b) and can be found on grape bunches (Flaherty et al. 1992 cited in DAFF 2013).</td>
<td>yes</td>
</tr>
<tr>
<td>European fruit lecanium scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Perperus innocuos</em></td>
<td>Unlikely: Sainty (1991) and Hely et al. (1982) indicates that adults feed on buds and foliage while larvae live in the soil.</td>
<td>no</td>
</tr>
<tr>
<td><em>Perperus lateralis</em> Lea, 1908 white striped weevil</td>
<td>Unlikely: Sainty (1991) and Hely et al. (1982) indicates that adults feed on buds and foliage while larvae live in the soil.</td>
<td>no</td>
</tr>
<tr>
<td><em>Perperus sp.</em> bud weevil</td>
<td>Unlikely: Sainty (1991) and Hely et al. (1982) indicates that adults feed on buds and foliage while larvae live in the soil.</td>
<td>no</td>
</tr>
<tr>
<td><em>Phenacoccus aceris</em> (Signoret, 1875) apple mealybug</td>
<td>Unlikely: Occurs on leaves and stems of a variety of plants (Ben-Dov 1994 cited in BA 2011b) including grapevine (Sforza et al. 2003 cited in BA 2011b). No records found of this pest on fruit (BA 2011b).</td>
<td>no</td>
</tr>
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<tr>
<td><em>Phyllotocus</em> sp.</td>
<td>Unlikely: Lawrence and Britton (1991) indicates that adults are short lived and swarm to flowering trees while the larvae inhabit the soil feeding on roots and other organic matter.</td>
<td>no</td>
</tr>
<tr>
<td><em>Phytoseius hongkongensis</em> Swirski &amp; Shechter, 1961 predatory mite</td>
<td>Not assessed</td>
<td>yes</td>
</tr>
<tr>
<td><em>Phytoseius woolwichensis</em> Schicha, 1977 predatory mite</td>
<td>Not assessed</td>
<td>yes</td>
</tr>
<tr>
<td><em>Plodia interpunctella</em> (Hübner, 1813) Indian meal moth</td>
<td>Unlikely: Buchanan et al. (1984) indicates that P. interpunctella is a pest of dried fruit.</td>
<td>no</td>
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<tr>
<td><em>Polistes chinensis antennalis</em> Perkins, 1905</td>
<td>Unlikely: <em>P. chinensis antennalis</em> prey on invertebrates and collect nectar and honeydew from flowers (Clapperton 1999).</td>
<td>no</td>
</tr>
<tr>
<td>Asian paper wasp</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Proprioseiopsis peltatus</em> (Van der Merwe, 1968)</td>
<td>Not assessed</td>
<td>yes</td>
</tr>
<tr>
<td>predatory mite</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pseudaulacaspis pentagona</em> (Targioni Tozzetti, 1886)</td>
<td>Likely: Miller and Davidson (1990 cited in ADoA 2014) reported that <em>P. pentagona</em> can be found on the leaves and sometimes on fruit of its hosts.</td>
<td>yes</td>
</tr>
<tr>
<td>peach white scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pseudococcus calceolariae</em> (Maskell, 1897)</td>
<td>Likely: Furness and Charles (2003) indicate that <em>P. calceolariae</em> can be found in sheltered positions such as grape bunches.</td>
<td>yes</td>
</tr>
<tr>
<td>citrophilus mealybug</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Psychoda alternata</em> Say, 1824</td>
<td>Likely: Recorded as a contaminant of table grapes in DAFF (2013).</td>
<td>yes</td>
</tr>
<tr>
<td>moth fly</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 7 Invertebrates associated with the table grape bunch pathway

<table>
<thead>
<tr>
<th>Organism</th>
<th>Pathway association (presence on grape bunch)</th>
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</thead>
<tbody>
<tr>
<td><strong>Rhizobius ruficollis</strong> Lea, 1890</td>
<td>Likely: Furness and Charles (2003) indicate that <em>R. ruficollis</em> parasitises long-tailed and citrophilus mealybug which can be found in sheltered positions such as grape bunches.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Rhizoecus falcifer</em> Kunckel d'Herculais, 1878</td>
<td>Unlikely: <em>R. falcifer</em> is a ground-inhabiting mealybug (McKenzie 1967).</td>
<td>no</td>
</tr>
<tr>
<td><em>Rhyparida dimidiata</em> Baly, 1861</td>
<td>Likely: Matthews and Reid (2002) indicates that larvae are soil dwelling and adults can be foliage or nectar feeders.</td>
<td>no</td>
</tr>
<tr>
<td><em>Scelodonta brevipilis</em> Lea, 1915</td>
<td>Likely: ABRS (2011) indicates that members of the Chrysomelid subfamily Eumolpinae feed on leaves, flowers and/or fruit of a wide variety of angiosperms as adults.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Scutiphora pedicellata</em> (Kirby, 1826)</td>
<td>Likely: Hely et al. (1982) indicates that <em>S. pedicellata</em> feeds on vegetative growth and fruit.</td>
<td>yes</td>
</tr>
</tbody>
</table>
### Table 7 Invertebrates associated with the table grape bunch pathway

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<tr>
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<tbody>
<tr>
<td><em>Serrodes campana</em> Guenée, 1852 fruitpiercing moth</td>
<td><strong>Unlikely:</strong> Adults attack fruit of grapevine (JSAE 1987 cited in ADoA 2014), but feed only at night and are not associated with grapevine during the day (Hattori 1969; NPQS 2007a cited in ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td><em>Simplicia caeneusalis</em> (Walker, 1859)</td>
<td><strong>Unlikely:</strong> Common (1990) indicates that larvae of <em>Simplicia</em> feed on dead leaves.</td>
<td>no</td>
</tr>
<tr>
<td><em>Sinoxylon</em> sp. auger beetle</td>
<td><strong>Unlikely:</strong> Lawrence and Britton (1991) indicates that Bostrichid beetles are wood boring insects.</td>
<td>no</td>
</tr>
<tr>
<td><em>Sinoxylon anale</em> Lesne, 1897 auger beetle</td>
<td><strong>Unlikely:</strong> Lawrence and Britton (1991) indicates that Bostrichid beetles are wood boring insects.</td>
<td>no</td>
</tr>
<tr>
<td><em>Sphaerococcopsis inflatipes</em> (Maskell, 1893)</td>
<td><strong>Unlikely:</strong> ABRS (2009) and Beardsley (1974) indicate that <em>S. inflatipes</em> resided in bark galls.</td>
<td>no</td>
</tr>
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<tbody>
<tr>
<td><em>Spilostethus decoratus</em> (Stål, 1866)</td>
<td>milkweed bug</td>
<td>yes</td>
</tr>
<tr>
<td><em>Testrica antica</em> Walker, 1867</td>
<td>Not assessed</td>
<td>yes</td>
</tr>
<tr>
<td><em>Tetracnemoidea brevicornis</em> (Girault, 1915)</td>
<td>parasitic wasp</td>
<td>Likely: Furness and Charles (2003) indicates that <em>T. brevicornis</em> parasitises long-tailed and citrophilus mealybug which can be found in sheltered positions such as grape bunches. yes</td>
</tr>
<tr>
<td><em>Tetranychus kanzawai</em> Kishida, 1927</td>
<td>Kanzawa spider mite</td>
<td>Likely: <em>T. kanzawai</em> mites and webbing are often found on the under surfaces of the leaves, but can occasionally attack and breed on grape berries (Ho and Chen 1994; Ashihara 1996BA 2011b). yes</td>
</tr>
<tr>
<td><em>Theretra clotho</em> (Drury, 1773)</td>
<td><em>hawk moth</em></td>
<td>Unlikely: This species feeds on grapevine (CABI 2012 cited in ADoA 2014). However, Sphingids oviposit on leaves while larvae feed on leaves or occasionally stems and pupate in the soil (Australian Museum 2009 cited in ADoA 2014). no</td>
</tr>
</tbody>
</table>
### Table 7 Invertebrates associated with the table grape bunch pathway

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<tr>
<td><em>Thrips coloratus</em> Schmutz, 1913</td>
<td><strong>Unlikely:</strong> This species is associated with flowers (Mound &amp; Masumoto 2005) and not fruit (ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td>loquat thrips</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Thrips flavus</em> Schrank, 1776</td>
<td><strong>Unlikely:</strong> No records have been found which associate this species with fruit (ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td>honeysuckle thrips</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Trionymus</em> sp.</td>
<td><strong>Unlikely:</strong> TPPD (2011) has single record from Vitis in 1979.</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Trogoderma variabile</em> Ballion 1878</td>
<td><strong>Likely:</strong> Recorded as a contaminant of table grapes in DAFF (2013).</td>
<td>yes</td>
</tr>
<tr>
<td>warehouse beetle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMA (s22) declared pest</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Vespula germanica</em> (Fabricus, 1793)</td>
<td><strong>Likely:</strong> Ward (2001) indicates that some wineries have to bring harvests forward to reduce losses when wasp numbers are high.</td>
<td>yes</td>
</tr>
<tr>
<td>European wasp</td>
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<tr>
<td><em>Xanthogaleruca luteola</em> (Müller, 1766)</td>
<td><strong>Unlikely:</strong> <em>X. luteola</em> feeds only on elm trees although it may overwinter in crevices near elm trees, houses, sheds and other protected places (DAFF 2013).</td>
<td>no</td>
</tr>
<tr>
<td>elm leaf beetle</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Xylobosca decisa</em> Lesne, 1906</td>
<td><strong>Unlikely:</strong> Lawrence and Britton (1991) indicates that Bostrichid beetles are wood boring insects.</td>
<td>no</td>
</tr>
<tr>
<td><em>Xylopsocus capucusinus</em> (Fabricius, 1781)</td>
<td><strong>Unlikely:</strong> Larvae feed on roots and adults bore into stems (Woodruff et al. 2014).</td>
<td>no</td>
</tr>
<tr>
<td>false powderpost beetle</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Xylothrips flavipes</em> (Illiger, 1801)</td>
<td><strong>Unlikely:</strong> Bostrichidae adults and larvae feed on the woody tissues of their host plants (Liu et al. 2008).</td>
<td>no</td>
</tr>
<tr>
<td>auger beetle</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Zygina</em> sp.</td>
<td><strong>Unlikely:</strong> VAIC (2011) has single record from <em>Vitis vinifera</em> in 1995.</td>
<td>no</td>
</tr>
<tr>
<td>[Hemiptera: Cicadellidae]</td>
<td></td>
<td></td>
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<tr>
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<td>Potential economic consequence</td>
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</tr>
<tr>
<td><em>Anagyrus fusciventris</em> (Girault, 1915) parasitic wasp</td>
<td>Likely: Furness and Charles (2003) indicates that <em>A. fusciventris</em> parasitises long-tailed mealybug which can be found in sheltered positions such as grape bunches.</td>
<td>Unlikely: Furness and Charles (2003) established <em>A. fusciventris</em> as a biocontrol agent.</td>
</tr>
<tr>
<td><em>Argyrolepidia subaspersa</em> (Walker)</td>
<td>Not assessed</td>
<td>Unlikely: The paucity of available literature on <em>A. subaspersa</em> indicates a non-pestiferous nature.</td>
</tr>
<tr>
<td><em>Bactrocera (Bactrocera) tryoni</em> (Froggatt, 1897) Queensland fruit fly</td>
<td>Likely: Host plants listed in Hancock et al. (2000) are present in WA.</td>
<td>Likely: White and Hancock (1997) indicates that <em>B. tryoni</em> is the most serious insect pest of fruit and vegetable crops in Australia.</td>
</tr>
<tr>
<td><em>Chrysomphalus dictyospermi</em> (Morgan, 1889) Spanish red scale</td>
<td>Likely: Host plants listed in Miller and Davidson (2005) are present in WA.</td>
<td>Likely: Is of economic importance to several hosts and a serious pest of citrus (Miller &amp; Davidson 2005).</td>
</tr>
</tbody>
</table>
**Table 8 Potential for establishment and economic consequences (invertebrates)**

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<tr>
<td><em>Chrysopa</em> spp. green lacewing</td>
<td><strong>Likely</strong>: ICDb (2011) lists several <em>Chrysopa</em> spp. present in WA.</td>
<td><strong>Unlikely</strong>: Furness and Charles (2003) indicates that <em>Chrysopa</em> spp. are biocontrol agents.</td>
<td>no</td>
</tr>
<tr>
<td><em>Chrysoperla</em> spp. green lacewing</td>
<td><strong>Not assessed</strong></td>
<td><strong>Unlikely</strong>: Many species of the genus <em>Chrysoperla</em> are important biological control agents (New 2002; Pappas et al. 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Colgar peracutum</em> (Walker, 1858) citrus planthopper</td>
<td><strong>Likely</strong>: Smith et al. (1997) indicates that <em>C. peracutum</em> feed on citrus, grape, potato and other plants that are grown in WA.</td>
<td><strong>Likely</strong>: Smith et al. (1997) indicates that <em>C. peracutum</em> can damage fruit.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Cryptolestes pusillus</em> (Schönherr 1878) flat grain beetle BAMA (s22) declared pest</td>
<td><strong>Likely</strong>: <em>C. pusillus</em> is a cosmopolitan species that has been transported internationally in exported commodities. <em>C. pusillus</em> is present in Australia (Tay et al. 2014).</td>
<td><strong>Likely</strong>: <em>Cryptolestes</em> are important pests of cereals, cereal products, oilseeds and dried processed foods of vegetable origin (Rees 2004).</td>
<td>yes</td>
</tr>
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</tr>
<tr>
<td><em>Daktulosphaira vitifoliae</em> (Fitch, 1855)</td>
<td><strong>Likely:</strong> <em>Vitis vinifera</em>, the sole host for <em>D. vitifoliae</em> (Buchanan et al. 2003). Both table and wine grapes are grown extensively in WA (DAFWA 2006; DAFWA 2014a).</td>
<td><strong>Likely:</strong> Buchanan et al. (2003) indicate that <em>D. vitifoliae</em> is the world’s worst grape pest.</td>
<td>yes</td>
</tr>
<tr>
<td>grape phylloxera</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Dolichogenidea tasmanica</em> (Cameron, 1912)</td>
<td><strong>Likely:</strong> Bailey et al. (2003) lists <em>D. tasmanica</em> as a biocontrol agent for Light brown apple moth, a pest present in WA.</td>
<td><strong>Unlikely:</strong> Bailey et al. (2003) indicates that <em>D. tasmanica</em> as a biocontrol agent.</td>
<td>no</td>
</tr>
<tr>
<td>parasitic wasp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ephippitytha maculata</em> Evans, 1847</td>
<td><strong>Not assessed</strong></td>
<td><strong>Unlikely:</strong> The absence of available literature on the <em>E. maculata</em> indicates a non-pestiferous nature.</td>
<td>no</td>
</tr>
<tr>
<td>bush katydid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Eristalinus (Lathyrophthalmus) aeneus</em> (Scopoli, 1763)</td>
<td><strong>Not assessed</strong></td>
<td><strong>Unlikely:</strong> Syrphidae adults are pollen and nectar feeders and can be pollinators of major significance. Most Eristalinae are saprophagous (Evenhuis 1989).</td>
<td>no</td>
</tr>
<tr>
<td>hover fly</td>
<td></td>
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</tbody>
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### Table 8 Potential for establishment and economic consequences (invertebrates)

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<tr>
<td><em>Euproctis paradoxa</em> (Butler, 1886) native tussock moth</td>
<td><strong>Likely:</strong> Poole et al. (2011) lists <em>E. paradoxa</em> hostplants as Avocado, grape, nectarine, peach and radiata pine which are grown extensively in WA (DAFWA 2006; DAFWA 2014a).</td>
<td><strong>Likely:</strong> Hely et al. (1982) indicates that <em>E. paradoxa</em> can feed on the stalks of ripening grapes and cause heavy fruit fall.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Graptostethus</em> sp. crusader bug</td>
<td><strong>Likely:</strong> JD Swan (2011, pers. comm.) lists <em>Graptostethus</em> sp. as a pest of <em>Vitis</em> which is grown extensively in WA (DAFWA 2006; DAFWA 2014a).</td>
<td><strong>Likely:</strong> Chin et al. (2009) indicates that when these bugs swarm, they generally do not feed but may cause physical damage by breaking off stems or cause scratch marks on leaves, flowers or fruit by moving on the plants in such large numbers.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Misumena</em> spp. crab spider</td>
<td><strong>Not assessed</strong></td>
<td><strong>Unlikely:</strong> Spiders in this genus are predators not plant pests (DAFF 2013).</td>
<td>no</td>
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<tr>
<td>Ozoliarus pitta Löcker, 2006</td>
<td><strong>Likely:</strong> Both table and wine grapes are grown extensively in WA (DAFWA 2006; DAFWA 2014a).</td>
<td><strong>Unlikely:</strong> The absence of available literature on <em>O. pitta</em> indicates a non-pestiferous nature.</td>
<td>no</td>
</tr>
<tr>
<td>Parthenolecanium corni corni (Bouché, 1844) European fruit lecanium scale</td>
<td><strong>Likely:</strong> <em>P. corni</em> is highly polyphagous with host plants in at least 40 families (Ben-Dov 2014b) many of which are present in Western Australia.</td>
<td><strong>Likely:</strong> ‘Infestations of <em>P. corni</em> result in reduced vigour and general debility of the host plant. Heavy infestations may result in chlorotic spotting and premature shedding of leaves, wilting and dieback of stems. Honeydew deposited on the leaves and fruit serves as a medium for the growth of black sooty moulds. The sooty mould results in a reduction of photosynthetic area and lowers the market value of ornamental plants and plant produce’ (CABI 2014). Capable of transmission of Grapevine leafroll-associated viruses (Sforza et al. 2003).</td>
<td>yes</td>
</tr>
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</tr>
<tr>
<td><em>Philonthus</em> spp. Stephens, 1829 rove beetle</td>
<td><strong>Likely:</strong> <em>Philonthus</em> spp. have been introduced to Australia by exported commodities and established (Moore 1968).</td>
<td><strong>Unlikely:</strong> Most Staphylinidae live in decomposing plant and/or animal matter. Most adults are predators, some are parasitoids of other insects (Hangay &amp; Zborowski 2010).</td>
<td>no</td>
</tr>
<tr>
<td><em>Phytoseius hongkongensis</em> Swirski &amp; Shechter, 1961 predatory mite</td>
<td><strong>Likely:</strong> <em>P. hongkongensis</em> has been recorded from <em>Vitis vinifera</em>, (ASCU 2011) which is grown extensively in WA (DAFWA 2006; DAFWA 2014a).</td>
<td><strong>Unlikely:</strong> (Jeppson et al. 1975) indicates that mites of the Phytoseiidae are an effective and widespread biocontrol agent.</td>
<td>no</td>
</tr>
<tr>
<td><em>Phytoseius woolwichensis</em> Schicha, 1977 predatory mite</td>
<td><strong>Likely:</strong> <em>P. woolwichensis</em> has been recorded from <em>Vitis vinifera</em> and other plant species (ASCU 2011), that are grown extensively in WA.</td>
<td><strong>Unlikely:</strong> Jeppson et al. (1975) indicates that mites of the Phytoseiidae are an effective and widespread biocontrol agent.</td>
<td>no</td>
</tr>
<tr>
<td><em>Proprioseiopsis peltatus</em> (Van der Merwe, 1968) predatory mite</td>
<td><strong>Likely:</strong> <em>P. peltatus</em> has been recorded from <em>Vitis vinifera</em> and other plant species (ASCU 2011), that are grown extensively in WA.</td>
<td><strong>Unlikely:</strong> Jeppson et al. (1975) indicates that mites of the Phytoseiidae are an effective and widespread biocontrol agent.</td>
<td>no</td>
</tr>
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</tr>
<tr>
<td><em>Pseudaulacaspis pentagona</em> (Targioni Tozzetti, 1886) peach white scale</td>
<td><strong>Likely</strong>: <em>P. pentagona</em> is highly polyphagous (Ben-Dov 2014c) with many host plants present in Western Australia.</td>
<td><strong>Likely</strong>: <em>P. pentagona</em> is a highly destructive pest of fruit trees and woody ornamentals throughout the world (Hanks &amp; Denno 1993; Ben-Dov 2014c).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Pseudococcus calceolariæ</em> (Maskell, 1897) citrophilus mealybug</td>
<td><strong>Likely</strong>: Ben-Dov et al. (2010) lists an extensive host range for <em>P. calceolariæ</em>, many of which are grown in WA.</td>
<td><strong>Likely</strong>: Furness and Charles (2003) indicates that a heavy infestation of <em>P. calceolariæ</em> can render a crop unsaleable.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Psychoda alternata</em> Say, 1824 moth fly</td>
<td><strong>Not assessed</strong></td>
<td><strong>Unlikely</strong>: Larvae live in moist areas around sewage plants and drain pipes (Barnes 2009 cited in DAFF 2013).</td>
<td>no</td>
</tr>
<tr>
<td><em>Rhizobius ruficollis</em> Lea ladybird</td>
<td><strong>Likely</strong>: Furness and Charles (2003) indicates that <em>R. ruficollis</em> parasitises long-tailed a pest with an extensive host range and is present in WA</td>
<td><strong>Unlikely</strong>: Furness and Charles (2003) indicates that <em>R. ruficollis</em> is a biological control agent</td>
<td>no</td>
</tr>
<tr>
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</tr>
<tr>
<td><em>Scelodonta brevipilis</em> Lea, 1915</td>
<td>Likely: QDPIF (2011) indicates that <em>S. brevipilis</em> has been recorded from <em>Vitis vinifera</em>.</td>
<td>Unlikely: The paucity of available literature on <em>E. maculata</em> indicates a non-pestiferous nature.</td>
<td>no</td>
</tr>
<tr>
<td><em>Scutiphora pedicellata</em> (Kirby, 1826) metallic shield bug</td>
<td>Likely: Fletcher (2007) indicates that <em>S. pedicellata</em> been recorded as affecting native figs, fruit trees such as apricot, cherry, peach and pear, and grapes which are grown in WA.</td>
<td>Likely: Fletcher (2007) indicates that <em>S. pedicellata</em> been recorded as affecting native figs, fruit trees such as apricot, cherry, peach and pear, and grapes which are grown in WA.</td>
<td>yes</td>
</tr>
<tr>
<td><em>Spilostethus decoratus</em> (Stål, 1866) milkweed bug</td>
<td>Not assessed</td>
<td>Unlikely: The absence of available literature including that available in Slater (1985) regarding <em>S. decoratus</em> indicates a non-pestiferous nature.</td>
<td>no</td>
</tr>
<tr>
<td><em>Testrica antica</em> Walker, 1867</td>
<td>Not assessed</td>
<td>Unlikely: The paucity of available literature on <em>Testrica antica</em> indicates a non-pestiferous nature.</td>
<td>no</td>
</tr>
</tbody>
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<tbody>
<tr>
<td><em>Tetracnemoidea brevicornis</em> (Girault, 1915)</td>
<td><strong>Likely:</strong> Furness and Charles (2003) indicates that <em>T. brevicornis</em> parasitises long-tailed a pest with an extensive host range and is present in WA.</td>
<td><strong>Unlikely:</strong> Furness and Charles (2003) indicates that <em>T. brevicornis</em> is a biological control agent.</td>
<td>no</td>
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<td>parasitic wasp</td>
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<td><em>Tetranychus kanzawai</em> Kishida, 1927</td>
<td><strong>Likely:</strong> <em>T. kanzawai</em> has established in Queensland and New South Wales (Walter 1999).</td>
<td><strong>Likely:</strong> <em>Tetranychus kanzawai</em> is a significant polyphagous pest subject to quarantine measures in many parts of the world (Navajas et al. 2001 cited in BA 2011a).</td>
<td>yes</td>
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<tr>
<td>Kanzawa spider mite</td>
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<tr>
<td><em>Trogoderma variabile</em> Ballion 1878</td>
<td><strong>Likely:</strong> <em>T. variabile</em> has become established in Australia, with restricted distribution in Queensland and WA (Rees et al. 2003).</td>
<td><strong>Likely:</strong> Internationally significant invasive pest of packed goods and stored grain (Castalanelli et al. 2011).</td>
<td>yes</td>
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<td>warehouse beetle</td>
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<td>BAMA (s22) declared pest</td>
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<tr>
<td><em>Vespula germanica</em> (Fabricus, 1793)</td>
<td><strong>Likely:</strong> Spradbery and Maywald (1992) outlines the climatic suitability of WA for <em>V. germanica</em>.</td>
<td><strong>Likely:</strong> Davis (2004) outlines the economic and social consequences of European wasp.</td>
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## Pest categorisation of pathogen organisms

### Table 9 Bacteria and phytoplasma associated with Australian viticulture

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<th>Higher classification</th>
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Table 9 Bacteria and phytoplasma associated with Australian viticulture

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<td>Enterobacteriales:</td>
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Table 9 Bacteria and phytoplasma associated with Australian viticulture

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<td><em>Pseudomonas viridiflava</em> (Burkholder, 1930) Dowson, 1939</td>
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# Table 9 Bacteria and phytoplasma associated with Australian viticulture

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<td>Rhizobiales: Rhizobiaceae</td>
<td><em>Rhizobium rubi</em> (Hildebrand, 1940) Young et al., 2001 comb. nov.</td>
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<td><em>Rhizobium vitis</em> (Ophel &amp; Kerr, 1990) Young et al., 2001</td>
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### Table 9 Bacteria and phytoplasma associated with Australian viticulture

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<td>Peronosporales:</td>
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<td>Peronosporales:</td>
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### Table 9 Bacteria and phytoplasma associated with Australian viticulture

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### Table 10 Fungi associated with Australian viticulture

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Botryosphaerales: *Botrysphaeriaceae*  
Phyllosticta sp.  
leaf spot  


**Pleurostomophora richardsiae** (Nannf.) L. Mostert, W. Gams & Crous, 2004  
[syn.: *Phialophora richardsiae* (Nannf.) Conant, 1937]
Table 10 Fungi associated with Australian viticulture

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<td>Leptothyphium fumago (Woron.) R.C. Srivast., 1982</td>
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| Diaporthales:          | *Diaporthe rudis* (Fr.) Nitschke, 1870  
  *Diaporthe faginea* Sacc. (Curr), 1882  
  [syn.: *Diaporthe medusaea* Nitschke 1870] | ADoA 2014  
  NSW (PHA 2001b) | yes |
| Diaporthaceae          |          |                        |                         |                                          |
| Dothideales:           | *Aureobasidium pullulans* (De Bary) G. Arnaud, 1918  
  [syn.: *Anthostomella pullans* (de Bary & Lowethal) F.T. Benn 1928  
  blue stain: wood] | PHA 2001b  
  WA (PHA 2001b)  
  Qld (PHA 2001b)  
  NSW (PHA 2001b)  
  ACT (PHA 2001b)  
  Vic. (PHA 2001b)  
  Tas. (PHA 2001b)  
  SA (PHA 2001b)  
  NT (PHA 2001b) | no |
| Dothioraceae           |          |                        |                         |                                          |
| Dothideales:           | *Aureobasidium pullulans* var. pullulans 1918  
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  Vic. (APPDb 2011) | yes |
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**Incertae sedis:**

**Glomerellaceae**

**Colletotrichum acutatum** J.H. Simmonds, 1968

[ripe rot]

**Hypocreales:**

**Nectriaceae**

**Ilyonectria radicicola** (Gerlach & L. Nilsson) Chaverri & C. Salgado, 2011


**Nectria cinnabarina** (Tode) Fr

Nectria twig blight

BA 2005

Qld (PHA 2001b) | Vic. (PHA 2001b) | Tas. (PHA 2001b) | yes
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SA (APPDb 2011)  | no |
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[syn.: *Pestalotia sessilis* Sacc., 1878]  | PHA 2001b  | WA (PHA 2001b)  
Qld (PHA 2001b)  | no |
| Incertae sedis: Monascaceae | *Xeromyces bisporus* L.R. Fraser, 1954  | Herb I.M.I. 2011  | NSW (Herb I.M.I. 2011)  | yes |
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### Table 11 Nematodes associated with Australian viticulture

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<td><em>Scutellonema clariceps</em> Phillips, 1971</td>
<td>PHA 2001b</td>
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<td>PHA 2001b</td>
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<td><em>Coslenchus costatus</em> Siddiqi, 1978</td>
<td>APPDb 2011</td>
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<td>Tylenchida: Tylenchulidae</td>
<td><em>Paratylenchus baldaccii</em> Raski, 1975</td>
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<td>Tylenchida: Tylenchulidae</td>
<td><em>Paratylenchus vandenbrandei</em> Samibaeva, 1966</td>
<td>APPDb 2011</td>
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Table 11 Nematodes associated with Australian viticulture

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<td>Vic. (Washington &amp; Nancarrow 1983)</td>
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<td></td>
<td></td>
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<td>SA (Cook &amp; Dubae 1989)</td>
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<tr>
<td>Physarida: Didymiaceae</td>
<td><em>Didema chondrioderma</em> (de Bary &amp; Rostaf.) Kuntze, 1898</td>
<td>APPDb 2011</td>
<td>SA (APPDb 2011)</td>
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Table 13 Virus and viroids associated with Australian viticulture

<table>
<thead>
<tr>
<th>Higher classification</th>
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<th>Vitis spp. association</th>
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<th>Consider further (if yes go to Table 14)</th>
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<tbody>
<tr>
<td>[Unassigned]</td>
<td><em>Sobemovirus: Sowbane mosaic virus</em></td>
<td>AQIS 1999</td>
<td>QLD</td>
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<tr>
<td>Bromoviridae</td>
<td><em>Alfamovirus Alfalfa mosaic virus</em></td>
<td>ADoA 2014</td>
<td>All Australian states and territories (Norton and Johnstone 1998 cited in ADoA 2014)</td>
<td>no</td>
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<tr>
<td>Bromoviridae</td>
<td><em>Cucumovirus Cucumber mosaic virus</em></td>
<td>ADoA 2014</td>
<td>WA</td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td>QLD (PHA 2001b)</td>
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<td>Vic. (PHA 2001b)</td>
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</table>
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<tr>
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<th>Consider further (if yes go to Table 14)</th>
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<tbody>
<tr>
<td>Bunyaviridae</td>
<td><em>Tospovirus: Tomato spotted wilt</em></td>
<td>DAFF 2013</td>
<td>WA (CABI-EPPO 1999 cited in DAFF 2013)</td>
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<td></td>
<td></td>
<td>Qld (CABI-EPPO 1999 cited in DAFF 2013)</td>
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<td>NSW (CABI-EPPO 1999 cited in DAFF 2013)</td>
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<td>Vic. (CABI-EPPO 1999 cited in DAFF 2013)</td>
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<td></td>
<td></td>
<td></td>
<td>Tas. (CABI-EPPO 1999 cited in DAFF 2013)</td>
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<td></td>
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<td>SA (CABI-EPPO 1999 cited in DAFF 2013)</td>
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</table>
## Table 13 Virus and viroids associated with Australian viticulture

<table>
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<th>Higher classification</th>
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<th>Vitis spp. association</th>
<th>Australian Distribution</th>
<th>Consider further (if yes go to Table 14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closteroviridae</td>
<td><em>Closterovirus Grapevine leafroll-associated virus 1</em> (GLRaV-1) grapevine leaf roll</td>
<td>APPDb 2011</td>
<td>WA (Constable et al. 2010 cited in ADoA 2014)</td>
<td>no</td>
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<td></td>
<td></td>
<td>Qld (Constable et al. 2010 cited in ADoA 2014)</td>
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<td>NSW (Constable et al. 2010 cited in ADoA 2014)</td>
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<td>Vic. (Constable et al. 2010 cited in ADoA 2014)</td>
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<td>SA (Constable et al. 2010 cited in ADoA 2014)</td>
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Table 13 Virus and viroids associated with Australian viticulture

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<th>Higher classification</th>
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<th>Consider further (if yes go to Table 14)</th>
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<tbody>
<tr>
<td>Closteroviridae</td>
<td><em>Closterovirus Grapevine leafroll-associated virus 2</em> (GLRaV-2) grapevine leaf roll</td>
<td>APPDb 2011</td>
<td>WA (Constable et al. 2010 cited in ADoA 2014)</td>
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</table>
### Table 13 Virus and viroids associated with Australian viticulture

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Table 13 Virus and viroids associated with Australian viticulture

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<th>Australian Distribution</th>
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<tr>
<td>Closteroviridae</td>
<td><em>Closterovirus Grapevine leafroll-associated virus 4</em> (GLRaV-4)</td>
<td>DAFF 2013</td>
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<td></td>
<td><em>Grapevine corky bark – associated with closterovirus</em> (GCBAVO)</td>
<td>DAFF 2013</td>
<td>WA</td>
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<td></td>
<td></td>
<td></td>
<td>Aust</td>
<td>(DAFF 2013)</td>
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<tr>
<td>Picornavirales:</td>
<td><em>Cherry leaf roll nepovirus</em></td>
<td>BA 2005</td>
<td>WA</td>
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<td>Cornovirinae</td>
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<td>Aust</td>
<td>(BA 2005)</td>
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<td>Picornavirales:</td>
<td><em>Fabavirus broad bean wilt virus 2</em></td>
<td>BA 2011a</td>
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<td>Secoviridae</td>
<td>Broad bean wilt virus</td>
<td>ADoA 2014</td>
<td>(Schwinghamer et al. 2007 cited in BA 2011a)</td>
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<td>BA 2011b</td>
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<td>Tas. (Munro 1987 cited in ADoA 2014)</td>
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<td>Picornavirales:</td>
<td><em>Nepovirus Grapevine fanleaf virus</em> (GFLV)</td>
<td>APPDb 2011</td>
<td>NSW (APPDb 2011) Vic. (Habili et al. 2001) SA (Habili et al. 2001)</td>
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<td>Picornavirales:</td>
<td><em>Nepovirus Strawberry latent ringspot</em></td>
<td>BA 2005</td>
<td>WA Absent (BA 2005)</td>
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<td>Secoviridae</td>
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<td>Picornavirales:</td>
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<td>Secoviridae</td>
<td>grapevine yellow vein</td>
<td>AQIS 1999</td>
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<td></td>
<td>Australian grapevine viroid</td>
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<td>Pospiviroidae</td>
<td>Aspcaviriod Australian grapevine viroid</td>
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<td>Pospiviroidae</td>
<td>Hostuviroid Hop stunt viroid (HSVd) hop stunt viroid</td>
<td>ADoA 2014</td>
<td>Vic. SA (Koltunow et al. 1988) (Rezaian et al. 1988)</td>
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### Table 13 Virus and viroids associated with Australian viticulture

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<td>Citrus exocortis viroid</td>
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<td>Tombusviridae</td>
<td><em>Nectroviroid Tobacco necrosis viruses</em> (TNV-?)</td>
<td>ADoA 2014 AQIS 1999 BA 2011a</td>
<td>Qld (Finlay and Teakle 1969 cited in ADoA 2014) Vic. (Finlay and Teakle 1969 cited in ADoA 2014)</td>
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<td>Tymovirales: Betaflexiviridae</td>
<td><em>Foveavirus Rupestris stem pitting-associated virus</em> (RSPaV)</td>
<td>APPDb 2011</td>
<td>WA (Collins 2001) Aust (ADoA 2014)</td>
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<td>Rupestris stem pitting</td>
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<td>DAFF 2013</td>
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<td>Tymovirales: Betaflexiviridae</td>
<td>Vitivirus Grapevine B virus (GVB)</td>
<td>DAFF 2013</td>
<td>Vic. (DAFF 2013) &lt;br&gt; SA (DAFF 2013)</td>
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<td>Tymovirales: Betaflexiviridae</td>
<td>Vitivirus: Grapevine virus d (GVD)</td>
<td>DAFF 2013</td>
<td>WA &lt;br&gt; Aust Absent (DAFF 2013)</td>
<td>yes</td>
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### Table 14 Pathogens associated with the table grape bunch pathway

<table>
<thead>
<tr>
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<th>Pathway association at the source orchard</th>
<th>Consider further (if yes go to Table 15)</th>
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<tbody>
<tr>
<td><strong>Bacteria &amp; Phytoplasmas</strong></td>
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<tr>
<td>Buckland Valley grapevine yellows (BVGY)</td>
<td><strong>Unlikely:</strong> Phytoplasmas are generally transmitted by graft transmission and leafhoppers in grapevines ((Pearson &amp; Goheen 1988; Constable et al. 2002). An insect vector has not been identified for BVGY (Constable et al. 2009).</td>
<td>no</td>
</tr>
<tr>
<td>Australian grapevine yellows</td>
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<tr>
<td><em>Rhizobium rubi</em> (Hildebrand, 1940) Young et al., 2001 comb. nov.</td>
<td><strong>Unlikely:</strong> <em>Rhizobium rubi</em> is associated with crown gall on canes of <em>Rubus</em> spp. and <em>Vitis</em> spp. (Young et al. 2001).</td>
<td>no</td>
</tr>
<tr>
<td>crown gall</td>
<td></td>
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<tr>
<td><strong>Fungi</strong></td>
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<tr>
<td><em>Alternaria vitis</em> Cavara, 1888</td>
<td><strong>Likely:</strong> Associated with grape berries (Washington &amp; Nancarrow 1983).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Ascochyta ampelina</em> Sacc., 1878</td>
<td><strong>Unlikely:</strong> <em>Ascochyta ampelina</em> is primarily a leaf pathogen (Kiewnick 1989).</td>
<td>no</td>
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<tr>
<td>Organism</td>
<td>Pathway association at the source orchard</td>
<td>Consider further (if yes go to Table 15)</td>
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<tr>
<td><em>Ascochyta chlorospora</em> Speg., 1879</td>
<td>Unlikely: <em>Ascochyta chlorospora</em> is generally associated with leaves of <em>Prunus</em> spp.</td>
<td>no</td>
</tr>
<tr>
<td><em>Aspergillus aculeatus</em> Iizuka, 1953</td>
<td>Likely: <em>Aspergillus</em> spp. are often associated with berry rots (Pearson &amp; Goheen 1988) and the record of <em>A. aculeatus</em> was from fruit (APPDb 2011).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Aspergillus atropurpureus</em> Zimm., 1902</td>
<td>Likely: <em>Aspergillus</em> spp. are often associated with berry rots (Pearson &amp; Goheen 1988) and the record of <em>A. atropurpureus</em> was associated with black mould (Washington &amp; Nancarrow 1983).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Aspergillus carbonarius</em> (Bainier) Thom, 1916</td>
<td>Likely: <em>Aspergillus</em> spp. are often associated with berry rots (Pearson &amp; Goheen 1988) and the record of <em>A. carbonarius</em> was associated with grape berries (PHA 2001b).</td>
<td>yes</td>
</tr>
</tbody>
</table>
Table 14 Pathogens associated with the table grape bunch pathway

<table>
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<tr>
<th>Organism</th>
<th>Pathway association at the source orchard</th>
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</thead>
<tbody>
<tr>
<td><em>Aureobasidium pullulans</em> var. <em>pullulans</em>, 1918</td>
<td><strong>Likely:</strong> <em>Aureobasidium pullulans</em> var. <em>pullulans</em> has been isolated from grape berries (APDDb 2014).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Botryosphaeria iberica</em> A.J.L. Phillips, J. Luque &amp; A. Alves, 2005</td>
<td><strong>Likely:</strong> <em>Botryosphaeria</em> species are most commonly associated with wood decay and canker (Urbez Torres et al. 2007 cited in DAFF 2013) but can also be associated with bunch rot (Cooperative Research Centre for Viticulture 2005, Wunderlick et al. 2010 cited in DAFF 2013).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Botryosphaeria sarmentosum</em> A.J.L. Phillips, J. Luque &amp; A. Alves, 2005</td>
<td><strong>Likely:</strong> <em>Botryosphaeria</em> species are most commonly associated with wood decay and canker (Urbez Torres et al. 2007 cited in DAFF 2013) but can also be associated with bunch rot (Cooperative Research Centre for Viticulture 2005, Wunderlick et al. 2010 cited in DAFF 2013).</td>
<td>yes</td>
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<tr>
<td><em>Capnodium elongatum</em> Berk. &amp; Desm., 1849</td>
<td><strong>Likely:</strong> <em>Capnodium</em> sp. are saprophytic fungi that live on insect honeydew (Horst 2013).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Cladophialophora bantiana</em> (Sacc.) de Hoog, Kwon-Chung &amp; McGinnis, 1995</td>
<td><strong>Unlikely:</strong> Reported in association with canes (Washington &amp; Nancarrow 1983).</td>
<td>no</td>
</tr>
<tr>
<td><em>Cladosporium uvarum</em> McAlpine, 1898</td>
<td><strong>Likely:</strong> <em>Cladosporium</em> spp. are often associated with berry rots (Pearson &amp; Goheen 1988). <em>C. uvarum</em> was described in association with berries (Dugan et al. 2004).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Cryptovalsa ampelina</em> (Nitschke) Fuckel, 1870</td>
<td><strong>Unlikely:</strong> Reported in association with grapevine canes (Mostert et al. 2004; APPDb 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Cylindrocarpon liriodendri</em> J.D. MacDon. &amp; E.E. Butler, 1981</td>
<td><strong>Unlikely:</strong> <em>Cylindrocarpon liriodendri</em> associated with black-foot root disease of grapevines (Whitelaw-Weckert et al. 2007).</td>
<td>no</td>
</tr>
<tr>
<td><em>Cytospora mammosa</em> McAlpine, 1898</td>
<td><strong>Likely:</strong> Reported in association with grape berries (Washington &amp; Nancarrow 1983).</td>
<td>yes</td>
</tr>
<tr>
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</tr>
<tr>
<td>----------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td><em>Diaporthes rudi</em> (Fr.) Nitschke, 1870</td>
<td>Unlikely: Found on bark of branches and twigs, also reported on leaves of hosts (Farr &amp; Rossman, 2012 cited in ADoA 2014). Causes bud blight of grapevine (Fukaya et al. 1988, Fukaya and Kato 1994 cited in ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td><em>Diatrype stigma</em> (hoffm.) Fr., 1849</td>
<td>Unlikely: Reported from cankered wood of grapevines in California and colonisation of dormant canes/mature wood causing vascular necrosis. (ADoA 2014). No association with grape bunches was found. (ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td><em>Diatrypella vulgaris</em> Trouillas, W. M. Pitt &amp; Gubler, sp. nov.</td>
<td>Unlikely: Isolated from cankers on grapevines (Trouillas et al. 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Diplodia sclerotiorum</em> Viala &amp; Sacc., 1892</td>
<td>Unlikely: Reported in association with leaves (APPDb 2011).</td>
<td>no</td>
</tr>
</tbody>
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### Table 14 Pathogens associated with the table grape bunch pathway

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<tr>
<td><em>Eutypella microtheca</em> Trouillas, W. M. Pitt &amp; Gubler sp. nov.</td>
<td><strong>Unlikely:</strong> Isolated from dead branches of grapevines (Trouillas et al. 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Fomitiporia australiensis</em> M. Fisch., J. Edwards, Cunningt. &amp; Pascoe, 2005</td>
<td><strong>Unlikely:</strong> <em>Fomitiporia australiensis</em> has been isolated from stems and trunks of grapevines in association with canker and heart rot (Fischer et al. 2005; APPDb 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Fomitiporia punctata</em> (Fr.) Murrill, 1947</td>
<td><strong>Unlikely:</strong> <em>Fomitiporia punctata</em> has been isolated from stems of grapevines in association with white heart rot (Fischer et al. 2005; APPDb 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Greeneria uvicola</em> (Berk. &amp; M.A. Curtis) Punith., 1974 bitter rot</td>
<td><strong>Likely:</strong> <em>Greeneria uvicola</em> is associated with bitter rot of fruit of grapevines (Pearson &amp; Goheen 1988). Recorded from grape berry in Australia (PHA 2001b).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Hendersonia corticalis</em> Ellis &amp; Everh.</td>
<td><strong>Likely:</strong> Reported in association with fruit (Washington &amp; Nancarrow 1983).</td>
<td>yes</td>
</tr>
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<tr>
<td><em>Lachnella alboviolascens</em> (Alb. &amp; Schwein.) Fr., 1849</td>
<td>Unlikely: One record of this fungus on grapevines was associated with bark (Washington &amp; Nancarrow 1983). Generally associated with woody and herbaceous stems (Farr &amp; Rossman 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Leptoxypium fumago</em> (Woron.) R.C. Srivast., 1982</td>
<td>Unlikely: Isolated from <em>Vitis</em> sp. leaf (APPDb 2011).</td>
<td>no</td>
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<tr>
<td><em>Monochaetinula ampelophila</em> (Speg.) Nag Raj, 1993</td>
<td>Unlikely: <em>Monochaetia</em> species (syn. <em>M. ampelophila</em>) are generally reported in association with leaves (Sutton 1980).</td>
<td>no</td>
</tr>
<tr>
<td><em>Pestalotiopsis funerea</em> (Desm.) Steyaert leaf spot</td>
<td>Unlikely: Affects leaves, stems and roots of its hosts (Mordue 1976 cited in ADoA 2014). No report of association with grape bunches was found (ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td><em>Mycosphaerella succedanea</em> (Pass.) Tomilin, 1970</td>
<td>Unlikely: Reported in association with leaves (APPDb 2011). The genus <em>Mycosphaerella</em> are generally considered follicolous (growing, or living, on leaves) (CBS-KNAW 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Nectria cinnabarina</em> (Tode) Fr</td>
<td>Unlikely: <em>N. cinnabarina</em> acts mostly as a saprophyte, living on dead plant tissue, and as such is not generally considered a serious pathogen. However, it is also weakly pathogenic, colonizing stems and branches weakened by mechanical injury, physiological stress, or other disease (BA 2005).</td>
<td>no</td>
</tr>
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<tr>
<td><em>Papulaspora biformosa</em> Kiril., 1971</td>
<td>Unlikely: Reported in association with <em>Vitis vinifera</em> roots (APPDb 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Penicillium bicolor</em> (Lilj.) Fr., 1832</td>
<td>Likely: <em>Penicillium</em> spp. are commonly associated with berry rots (Pearson &amp; Goheen 1988).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Penicillium simplicissimum</em> (Oudem.) Thom, 1930</td>
<td>Likely: <em>Penicillium</em> spp. are commonly associated with berry rots (Pearson &amp; Goheen 1988).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Penicillium viticola</em> Nonaka &amp; Masuma, 2011</td>
<td>Likely: <em>Penicillium viticola</em> has been isolated from grape bunches (ADoA 2014).</td>
<td>yes</td>
</tr>
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<td><em>Pestalotiopsis menezesiana</em> (Bres. &amp; Torrend) Bissett, 1983</td>
<td>Likely: <em>Pestalotiopsis menezesiana</em> has been reported in association with defoliation of grapevines and berry rot (Sergeeva et al. 2005).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Pestalotiopsis uvicola</em> (Speg.) Bissett, 1983</td>
<td>Likely: <em>Pestalotiopsis uvicola</em> has been reported in association with wood and berry rot of grapevines (Sergeeva et al. 2005).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Phaeoacremonium australiense</em> L. Mostert, Summerb. &amp; Crous, 2005</td>
<td>Unlikely: Reported in association with grapevine canes and stems (Mostert et al. 2006; APPDb 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Phellinus punctatus</em> (Fr.) Pillát, 1942</td>
<td>Unlikely: Reported in association with Esca/heart rot affecting stems (APPDb 2011).</td>
<td>no</td>
</tr>
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<tr>
<td><em>Phyllosticta</em> sp.</td>
<td><strong>Unlikely:</strong> Phyllosticta leaf spot only affects leaves (NPQS 2007 cited in BA 2011b).</td>
<td>no</td>
</tr>
<tr>
<td>leaf spot</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pilidiella castaneicola</em> (Ellis &amp; Everh)</td>
<td><strong>Likely:</strong> Causes white rot of table grapes. It affects rachis, pedicel and berries (ADoA 2014).</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pleurostomophora richardsiae</em> (Nannf.) L. Mostert, W. Gams &amp; Crous, 2004</td>
<td><strong>Unlikely:</strong> Reported in association with grapevine trunks and causing vascular discolouration similar to Petri disease (Halleen et al. 2007).</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Phoma tuberculata</em> McAlpine, 1898</td>
<td><strong>Likely:</strong> <em>Phoma tuberculata</em> was described from berries with soft rot symptoms (CABI Bioscience 2011).</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Phomopsis viticola</em> (Sacc.) Sacc., 1915</td>
<td><strong>Likely:</strong> <em>Phomopsis viticola</em> is known to infect berries (Pearson &amp; Goheen 1988; Savocchia et al. 2007).</td>
<td>yes</td>
</tr>
<tr>
<td>Phomopsis cane and leaf spot</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Physarum</em> sp.</td>
<td><strong>Unlikely:</strong> Physarum mould occurs on leaves of grapevines (BA 2011b).</td>
<td>no</td>
</tr>
<tr>
<td>dusty mould</td>
<td></td>
<td></td>
</tr>
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<tbody>
<tr>
<td><em>Pseudocercospora vitis</em> (Lév.) Spec., 1910</td>
<td>Unlikely: Reported as causing leaf blight (Pearson &amp; Goheen 1988; APPDb 2011). Infects leaves (ADoA 2014). No report of association with grape bunches (ADoA 2014).</td>
<td>no</td>
</tr>
<tr>
<td><em>Pythium rostratum</em> E.J. Butler, 1907</td>
<td>Unlikely: <em>Pythium</em> spp. are generally associated with damping-off and root diseases (Hawksworth et al. 1995).</td>
<td>no</td>
</tr>
<tr>
<td><em>Sarocladium strictum</em> (W. Gams) Summerbell</td>
<td>Unlikely: Associated with wood (APPDb 2011), also sometimes isolated as an endophytic pathogen associated with twigs, leaves and clusters (Garijo et al. 2011; González &amp; Tello 2011)</td>
<td>no</td>
</tr>
<tr>
<td><em>Seimatosporium hysteroides</em> (Fuckel) Brockmann, 1976</td>
<td>Unlikely: Reported in association with twigs, stems and canes (Sergeeva et al. 2005).</td>
<td>no</td>
</tr>
</tbody>
</table>
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<tbody>
<tr>
<td><em>Sphaerella fumaginea</em> Catt., 1879</td>
<td><strong>Unlikely:</strong> Original description based on isolate from grapevine branches and twigs (CABI Bioscience 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Sphaerella vitis</em> Fuckel, 1870</td>
<td><strong>Unlikely:</strong> Original description based on isolate from grapevine leaves (CABI Bioscience 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Sporocadus rhododendri</em> (Schwein.) M. Morelet, 1985</td>
<td><strong>Unlikely:</strong> Reported in association with canes (Sergeeva et al. 2005; APPDb 2011).</td>
<td>no</td>
</tr>
<tr>
<td><em>Strumella vitis</em> McAlpine, 1898</td>
<td><strong>Likely:</strong> Reported in association with fruit (Washington &amp; Nancarrow 1983; APPDb 2011).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Talaromyces wortmannii</em> (Klocker) C.R. Benjamin, 1955</td>
<td><strong>Unlikely:</strong> Primarily reported for soil and seeds (BA 2005; Pitt &amp; Hocking 2009).</td>
<td>no</td>
</tr>
<tr>
<td><em>Tilletiopsis washingtonesis</em> Nyland, 1950</td>
<td><strong>Unlikely:</strong> Members of this genus are saprophytes and colonise the leaf surface (Urquhart et al. 1997 cited in ADoA 2014).</td>
<td>no</td>
</tr>
</tbody>
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<tr>
<td><em>Torula viticola</em> Allesch.</td>
<td><strong>Likely:</strong> There is some evidence to suggest that <em>T. viticola</em> may occur on bunch tissues, as it has been reported on cane tissue of <em>V. vinifera</em> in Victoria (Washington &amp; Nancarrow 1983).</td>
</tr>
<tr>
<td><em>Trichoderma citrinoviride</em> Bissett 1984</td>
<td><strong>Unlikely:</strong> <em>Trichoderma</em> sp. are cosmopolitan in soils and on decaying wood and vegetable matter (Gams &amp; Bissett 2002).</td>
</tr>
<tr>
<td><em>Truncatella angustata</em> (Pers.) S. Hughes, 1958</td>
<td><strong>Unlikely:</strong> Reported in association with stems (APPDb 2011) and as an endophyte on twigs and branches (González &amp; Tello 2011).</td>
</tr>
<tr>
<td><em>Venturia tremulae</em> Aderh., 1897</td>
<td><strong>Unlikely:</strong> Pathogen will cause leaf fall, recurrent infection cause poor growth &amp; dieback (Smith et al. 1988).</td>
</tr>
<tr>
<td><em>Xeromyces bisporus</em> L.R. Fraser, 1954</td>
<td><strong>Unlikely:</strong> <em>Xeromyces bisporus</em> is a food spoilage fungi, associated with dried fruit (Dallyn &amp; Everton 1969; Herb I.M.I. 2011).</td>
</tr>
</tbody>
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<tr>
<td><strong>Nematodes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Aphelenchoides coffeae</em> (Zimmeman, 1898) Filipjev, 1934</td>
<td><strong>Unlikely:</strong> <em>Aphelenchoides</em> spp. are ectoparasites that generally feed on leaves and stems (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Aphelenchoides limberi</em> Steiner, 1936</td>
<td><strong>Unlikely:</strong> <em>Aphelenchoides</em> spp. are ectoparasites that generally feed on leaves and stems (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Criconema mutabile</em> Taylor, 1936</td>
<td><strong>Unlikely:</strong> <em>Criconema mutabile</em> has been reported in association with grapes in soil around the rhizosphere (Deimi &amp; Mitkowski 2010).</td>
<td>no</td>
</tr>
<tr>
<td><em>Discolaimus agricolus</em> Sauer &amp; Annells, 1986</td>
<td><strong>Unlikely:</strong> Collected from vineyard soil (Sauer &amp; Annells 1985).</td>
<td>no</td>
</tr>
<tr>
<td><em>Helicotylenchus caribensis</em> Román, 1965</td>
<td><strong>Unlikely:</strong> <em>Helicotylenchus</em> species are ecto-parasitic, semi-endo-parasitic or endoparasitic nematodes of roots (Luc et al. 1990).</td>
<td>no</td>
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<tr>
<td><em>Helicotylenchus digonicus</em> Perry, 1959</td>
<td><strong>Unlikely:</strong> <em>Helicotylenchus</em> species are ecto-parasitic, semi-endo-parasitic or endoparasitic nematodes of roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Helicotylenchus varicaudatus</em> Yuen, 1964</td>
<td><strong>Unlikely:</strong> <em>Helicotylenchus</em> species are ecto-parasitic, semi-endo-parasitic or endoparasitic nematodes of roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Hemicriconemoides</em> sp. Chitwood &amp; Birchfield, 1957</td>
<td><strong>Unlikely:</strong> <em>Hemicriconemoides</em> species are generally associated with roots and found in soil around the rhizosphere (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Meloidogyne thamesi</em> Chitwood, 1952</td>
<td><strong>Unlikely:</strong> <em>Meloidogyne</em> species are associated with roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Neodolichodorus cassati</em> Siddiqi, 1977</td>
<td><strong>Unlikely:</strong> <em>Neodolichodorus</em> species belong to the awl nematode group and are associated with aquatic environments and soil (Nickle 1991).</td>
<td>no</td>
</tr>
</tbody>
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<tr>
<td><em>Neodolicodorus obtusus</em> Andrassy, 1976</td>
<td><strong>Unlikely</strong>: <em>Neodolicodorus</em> species belong to the awl nematode group and are associated with aquatic environments and soil (Nickle 1991).</td>
<td>no</td>
</tr>
<tr>
<td><em>Paratylenchus baldaccii</em> Raski, 1975</td>
<td><strong>Unlikely</strong>: <em>Paratylenchus</em> species are obligate root parasites of a large range of plant species (Siddiqi 2000).</td>
<td>no</td>
</tr>
<tr>
<td><em>Paratylenchus coronatus</em> Colbran, 1965</td>
<td><strong>Unlikely</strong>: <em>Paratylenchus</em> species are obligate root parasites of a large range of plant species (Siddiqi 2000).</td>
<td>no</td>
</tr>
<tr>
<td><em>Paratylenchus dianthus</em> Jenkins &amp; Taylor, 1956</td>
<td><strong>Unlikely</strong>: <em>Paratylenchus</em> species are obligate root parasites of a large range of plant species (Siddiqi 2000).</td>
<td>no</td>
</tr>
<tr>
<td><em>Paratylenchus hamatus</em> Thorne, 1950</td>
<td><strong>Unlikely</strong>: <em>Paratylenchus</em> species are obligate root parasites of a large range of plant species (Siddiqi 2000).</td>
<td>no</td>
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<tr>
<td><em>Paratylenchus projectus</em></td>
<td><strong>Unlikely:</strong> <em>Paratylenchus</em> species are obligate root parasites of a large range of plant species (Siddiqi 2000).</td>
<td>no</td>
</tr>
<tr>
<td><em>Paratylenchus vandenbrandei</em></td>
<td><strong>Unlikely:</strong> <em>Paratylenchus</em> species are obligate root parasites of a large range of plant species (Siddiqi 2000).</td>
<td>no</td>
</tr>
<tr>
<td><em>Pratylenchus alleni</em></td>
<td><strong>Unlikely:</strong> <em>Pratylenchus</em> species are migratory endoparasites that feed on roots (Luc et al. 1990)</td>
<td>no</td>
</tr>
<tr>
<td><em>Pratylenchus goodeyi</em></td>
<td><strong>Unlikely:</strong> <em>Pratylenchus</em> species are migratory endoparasites that feed on roots (Luc et al. 1990)</td>
<td>no</td>
</tr>
<tr>
<td><em>Pratylenchus hexincisus</em></td>
<td><strong>Unlikely:</strong> <em>Pratylenchus</em> species are migratory endoparasites that feed on roots (Luc et al. 1990)</td>
<td>no</td>
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<tbody>
<tr>
<td><em>Pratylenchus jordanensis</em> Hashim, 1983</td>
<td>Unlikely: <em>Pratylenchus</em> species are migratory endoparasites that feed on roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Pratylenchus loosi</em> Loof, 1960</td>
<td>Unlikely: <em>Pratylenchus</em> species are migratory endoparasites that feed on roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Pratylenchus pinguicaudatus</em> Corbett, 1969</td>
<td>Unlikely: <em>Pratylenchus</em> species are migratory endoparasites that feed on roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Pratylenchus pseudopratensis</em> Seinhorst, 1968</td>
<td>Unlikely: <em>Pratylenchus</em> species are migratory endoparasites that feed on roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Scutellonema clariceps</em> Phillips, 1971</td>
<td>Unlikely: <em>Scutellonema</em> species are primarily ectoparasites of roots (O’Bannon &amp; Duncan 1990).</td>
<td>no</td>
</tr>
</tbody>
</table>
Table 14 Pathogens associated with the table grape bunch pathway

<table>
<thead>
<tr>
<th>Organism</th>
<th>Pathway association at the source orchard</th>
<th>Consider further (if yes go to Table 15)</th>
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</thead>
<tbody>
<tr>
<td><em>Thornenema cavalcanti</em> Lordello, 1955</td>
<td>Unlikely: Members of the family Diphterophoridae are soil and marine dwelling nematodes (Nickle 1991).</td>
<td>no</td>
</tr>
<tr>
<td><em>Trichodorus</em> sp. Cobb, 1913</td>
<td>Unlikely: <em>Trichodorus</em> species are ectoparasites that feed on root sof perennial and woody plants (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Tylenchorhynchus</em> sp. Cobb, 1930</td>
<td>Unlikely: <em>Tylenchorhynchus</em> species are migratory ecto-, semi-ecto- or endo-parasites that feeds on roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Tylenchorhynchus sulcatus</em> de Guiran, 1967</td>
<td>Unlikely: <em>Tylenchorhynchus</em> species are migratory ecto-, semi-ecto- or endo-parasites that feeds on roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Xiphinema index</em> Thorne &amp; Allen, 1950</td>
<td>Unlikely: <em>Xiphinema</em> species are migratory ectoparasites that feed on roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
</tbody>
</table>
### Table 14 Pathogens associated with the table grape bunch pathway

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<tr>
<td><em>Xiphinema monohysterum</em> Brown, 1968</td>
<td><strong>Unlikely:</strong> <em>Xiphinema</em> species are migratory ectoparasites that feed on roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><em>Xiphinema pachtaicum</em> Tulaganov, 1938</td>
<td><strong>Unlikely:</strong> <em>Xiphinema</em> species are migratory ectoparasites that feed on roots (Luc et al. 1990).</td>
<td>no</td>
</tr>
<tr>
<td><strong>Protozoa</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Diderma chondrioderma</em> (de Bary &amp; Rostaf.) Kuntze, 1898</td>
<td><strong>Unlikely:</strong> <em>D. chondrioderma</em> is a slime mould and was reported in association with a grapevine stem.</td>
<td>no</td>
</tr>
<tr>
<td><strong>Viruses/Viroids</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Apscaviroid Australian grapevine viroid</em> (AGVd)</td>
<td><strong>Likely:</strong> Infects systemically; present in fruit and seed (Hadidi et al. 2003).</td>
<td>yes</td>
</tr>
</tbody>
</table>

*Australian grapevine viroid*
### Table 14 Pathogens associated with the table grape bunch pathway

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<tbody>
<tr>
<td><em>Apscaviroid Grapevine yellow speckle viroid (GYSVd)</em> stra...</td>
<td>Likely: Infects systemically; present in fruit and seed (Hadidi et al. 2003).</td>
<td>yes</td>
</tr>
<tr>
<td>- grapevine yellow speckle viroid, 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Apscaviroid Grapevine yellow speckle viroid (GYSVd)</em> stra...</td>
<td>Likely: Infects systemically; present in fruit and seed (Hadidi et al. 2003).</td>
<td>yes</td>
</tr>
<tr>
<td>- grapevine yellow speckle viroid, 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cherry leaf nepovirus</em></td>
<td>Unlikely: Causes chlorotic ringspots, leaf patterns and/or yellow vein netting. Virus transmitted by mechanical inoculation; transmitted by grafting; not transmitted by contact between plants (BA 2005).</td>
<td>no</td>
</tr>
<tr>
<td><em>Fabavirus broad bean wilt virus, 2</em></td>
<td>Likely: Recorded in grapevine. Probably infects systemically (BA 2011a).</td>
<td>yes</td>
</tr>
<tr>
<td>- broad bean wilt virus</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Hostuviroid Hop stunt viroid (HSVd)</em></td>
<td>Likely: Infects systemically; present in fruit and seed (Hadidi et al. 2003).</td>
<td>yes</td>
</tr>
<tr>
<td>- hop stunt viroid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organism</td>
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<td>----------------------------------------------</td>
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</tr>
<tr>
<td><em>Nepovirus Arabis mosaic virus</em></td>
<td><strong>Likely:</strong> This virus is associated with grapevine degeneration or decline (Martelli 2010 cited in ADoA 2014). Transmitted through seed of a number of species and found in infected weed seeds (Murant 1970 cited in ADoA 2014).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Sobemovirus: Sowbane mosaic virus</em></td>
<td><strong>Unlikely:</strong> Virus is detected in stem tissue and transmitted by mechanical inoculation or by seed. Infection is latent but very rare in Vitis sp. (ICTVdB Management 2006).</td>
<td>no</td>
</tr>
<tr>
<td><em>Nectrovirus Tobacco necrosis viruses (TNV-?)</em></td>
<td><strong>Likely:</strong> The strain of Tobacco necrosis virus found in grapevine in South Africa spreads systemically (Cesati and Van Regenmortel 1969); probably present in grape bunches (ADoA 2014).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Nepovirus Grapevine fanleaf virus (GFLV)</em> grapevine fanleaf virus</td>
<td><strong>Likely:</strong> Infects systemically; present in fruit and seed. Associated with the endosperm of grape seeds (Habili et al. 2001).</td>
<td>yes</td>
</tr>
</tbody>
</table>
### Table 14 Pathogens associated with the table grape bunch pathway

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<th>Consider further (if yes go to Table 15)</th>
</tr>
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<tbody>
<tr>
<td><strong>Nepovirus Strawberry latent ringspot</strong></td>
<td><strong>Unlikely:</strong> Long distance spread occurs via infected propagation material and local dissemination occurs via its root-feeding nematode vectors - <em>Xiphinema diversicaudatum</em> and <em>X. coxi</em> (Kreiah et al. 1994; CABI-EPPO 1997a; Adekunle et al. 2006 cited in DAFF 2013).</td>
<td>no</td>
</tr>
<tr>
<td><strong>Nepovirus Tomato ringspot virus</strong></td>
<td><strong>Unlikely:</strong> No evidence to suggest this virus is seed borne in table grapes (BA 2005).</td>
<td>no</td>
</tr>
<tr>
<td>grapevine yellow vein</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pospiviroid Citrus exocortis viroid (CEVd)</strong></td>
<td><strong>Likely:</strong> Infects systemically; present in fruit and seed (Hadidi et al. 2003).</td>
<td>yes</td>
</tr>
<tr>
<td>citrus exocortis viroid</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vitivirus Grapevine B virus (GVB)</strong></td>
<td><strong>Likely:</strong> Infects systemically; probably present in fruit and rachis (Martelli 1997).</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Vitivirus: Grapevine virus d (GVD)</strong></td>
<td><strong>Likely:</strong> Infects systemically. There is potential for it to be associated with the vascular tissues in table grape bunches (DAFF 2013).</td>
<td>yes</td>
</tr>
<tr>
<td>Organism</td>
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<tr>
<td><strong>Fungi</strong></td>
<td></td>
<td><img src="" alt="Table 15: Potential for establishment and economic consequences (pathogens)" /></td>
</tr>
<tr>
<td><em>Alternaria vitis</em> Cavara, 1888</td>
<td><strong>Likely:</strong> Other <em>Alternaria</em> spp. are established in Western Australia (APPDb 2011).</td>
<td><strong>Unlikely:</strong> <em>Alternaria vitis</em> primarily causes a leaf blight on <em>Vitis</em> spp. (Deepthi <em>et al.</em> 2009; Suhag <em>et al.</em> 1982). Very little information available as a berry rot other than in (Washington &amp; Nancarrow 1983).</td>
</tr>
<tr>
<td><em>Aspergillus aculeatus</em> Iizuka, 1953</td>
<td><strong>Likely:</strong> Other <em>Aspergillus</em> spp. are established in Western Australia (APPDb 2011).</td>
<td><strong>Unlikely:</strong> <em>Aspergillus aculeatus</em> is a secondary invader of damaged berries (Pearson &amp; Goheen 1988) and has been reported as a post-harvest pathogen of tomatoes (Kozakiewicz 2003).</td>
</tr>
</tbody>
</table>
Table 15 Potential for establishment and economic consequences (pathogens)

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<tr>
<td><strong>Aspergillus atropurpureus Zimm., 1902</strong></td>
<td><strong>Likely:</strong> Other <em>Aspergillus</em> species are established in Western Australia (APPDb 2011).</td>
<td><strong>Unlikely:</strong> <em>Aspergillus</em> species are generally secondary invaders of damaged berries (Pearson &amp; Goheen 1988). <em>A. atropurpureus</em> has not been reported as a pathogen of any other plant species (Farr &amp; Rossman 2011).</td>
<td>no</td>
</tr>
<tr>
<td><strong>Aspergillus carbonarius</strong> (Bainier) Thom, 1916</td>
<td><strong>Likely:</strong> Other <em>Aspergillus</em> spp. are established in Western Australia (APPDb 2011).</td>
<td><strong>Unlikely:</strong> <em>Aspergillus</em> spp. are generally secondary invaders of damaged berries (Pearson &amp; Goheen 1988). <em>A. atropurpureus</em> has not been reported as a pathogen of any other plant species (Farr &amp; Rossman 2011).</td>
<td>no</td>
</tr>
</tbody>
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Table 15 Potential for establishment and economic consequences (pathogens)

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<tbody>
<tr>
<td><em>Aureobasidium pullulans</em> var. <em>pullulans</em> 1918</td>
<td>Likely: Hosts of the fungus listed by (Farr &amp; Rossman 2011) are cultivated in Western Australia. Other <em>Aureobasidium</em> spp. are established in Western Australia (Plant Health Australia 2001).</td>
<td>Unlikely: <em>Aureobasidium pullulans</em> var. <em>pullulans</em> as <em>Auerobasidium vitis</em> var. <em>tuberculatum</em> has only been reported in association with grapevines twice and there are no reports of economic damage (Du Plessis 1948; Washington &amp; Nancarrow 1983).</td>
<td>no</td>
</tr>
<tr>
<td><em>Botryosphaeria iberica</em> A.J.L. Phillips, J. Luque &amp; A. Alves, 2005</td>
<td>Likely: Table grape vineyards are located from Gascoyne region in the north of the State to the South-West region of WA (DAFWA 2006). Western Australia is a notable fine wine producer. Wine grape vineyards are located in diverse areas of the South West of WA (DAFWA 2014a).</td>
<td>Likely: Due to their pathogenicity, prevalence, distribution and tolerance to a wide range of environmental conditions, Botryosphaeriaceae pose a significant threat to the Australian wine industry (Pitt et al. 2013).</td>
<td>yes</td>
</tr>
</tbody>
</table>
### Table 15 Potential for establishment and economic consequences (pathogens)

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</thead>
<tbody>
<tr>
<td><em>Botryosphaeria sarmentosum</em> A.J.L. Phillips, J. Luque &amp; A. Alves, 2005</td>
<td>Likely: Table grape vineyards are located from Gascoyne region in the north of the State to the South-West region of WA (DAFWA 2006). Western Australia is a notable fine wine producer. Wine grape vineyards are located in diverse areas of the South West of WA (DAFWA 2014a).</td>
<td>Likely: Due to their pathogenicity, prevalence, distribution and tolerance to a wide range of environmental conditions, Botryosphaeriaceae pose a significant threat to the Australian wine industry (Pitt et al. 2013).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Capnodium elongatum</em> Berk. &amp; Desm., 1849</td>
<td>Likely: Table grape vineyards are located from Gascoyne region in the north of the State to the South-West region of WA (DAFWA 2006). Western Australia is a notable fine wine producer. Wine grape vineyards are located in diverse areas of the South West of WA (DAFWA 2014a).</td>
<td>Likely: Excretion of sticky honeydew by mealybugs leads to sooty mould development on leaves and bunches if large populations arise. Sooty mould covering leaves can reduce photosynthesis and mould on grapes can make the fruit unsaleable or lead to rotting (Dunn &amp; Zurbo 2014).</td>
<td>yes</td>
</tr>
</tbody>
</table>
Table 15 Potential for establishment and economic consequences (pathogens)

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<tbody>
<tr>
<td><em>Cladosporium uvarum</em> McAlpine, 1898</td>
<td><strong>Likely:</strong> Hosts of the fungus listed by Farr &amp; Rossman (Farr &amp; Rossman 2011) are cultivated in Western Australia. Spores are airborne (Erkara et al. 2008). The fungus has established in other parts of Australia (Dugan et al. 2004).</td>
<td><strong>Unlikely:</strong> No evidence of economic significance (Nicholas et al. 1994).</td>
<td>no</td>
</tr>
<tr>
<td><em>Cytospora mammosa</em> McAlpine, 1898</td>
<td><strong>Likely:</strong> <em>Vitis vinifera</em> is the only reported host of <em>Cytospora mammosa</em> and is cultivated in Western Australia (Washington &amp; Nancarrow 1983)</td>
<td><strong>Unlikely:</strong> There has only been one report of this fungus worldwide and it is not listed as a major pathogen of grapes (Pearson &amp; Goheen 1988; Nicholas et al. 1994).</td>
<td>no</td>
</tr>
<tr>
<td>Organism</td>
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</tr>
<tr>
<td>-------------------------------------------------</td>
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<td>------------------------------------------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>bitter rot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Hendersonia corticalis</em> Ellis &amp; Everh.</td>
<td>Not assessed</td>
<td>Unlikely: There are very few reports of this fungus worldwide and it is not listed as a major pathogen of grapes (Pearson &amp; Goheen 1988; Nicholas et al. 1994).</td>
<td>no</td>
</tr>
<tr>
<td><em>Hendersonia tenuipes</em> McAlpine, 1898</td>
<td>Not assessed</td>
<td>Unlikely: There are very few reports of this fungus worldwide and it is not listed as a major pathogen of grapes (Pearson &amp; Goheen 1988; Nicholas et al. 1994).</td>
<td>no</td>
</tr>
</tbody>
</table>
**Table 15 Potential for establishment and economic consequences (pathogens)**

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</thead>
<tbody>
<tr>
<td><em>Penicillium bicolor</em> (Lilj.) Fr., 1832</td>
<td><strong>Likely</strong>: <em>Penicillium</em> spp. affect most kinds of fruit and vegetables (ADoA 2014). Many other <em>Penicillium</em> spp. are established in Western Australia (APPDb 2011).</td>
<td><strong>Unlikely</strong>: Species of <em>Penicillium</em> associated with berry rot are generally secondary invaders (Pearson &amp; Goheen 1988). Current management practices including good hygiene practices are likely to control additional <em>Penicillium</em> spp. (Pearson &amp; Goheen 1988).</td>
<td>no</td>
</tr>
<tr>
<td><em>Penicillium simplicissimum</em> (Oudem.) Thom, 1930</td>
<td><strong>Likely</strong>: <em>Penicillium</em> spp. affect most kinds of fruit and vegetables (ADoA 2014). Many other <em>Penicillium</em> spp. are established in Western Australia (APPDb 2011).</td>
<td><strong>Unlikely</strong>: Species of <em>Penicillium</em> associated with berry rot are generally secondary invaders (Pearson &amp; Goheen 1988). Current management practices including good hygiene practices are likely to control additional <em>Penicillium</em> spp. (Pearson &amp; Goheen 1988).</td>
<td>no</td>
</tr>
</tbody>
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</thead>
<tbody>
<tr>
<td><em>Penicillium viticola</em> Nonaka &amp; Masuma, 2011</td>
<td>Likely: <em>Penicillium</em> spp. affect most kinds of fruit and vegetables (ADoA 2014). Many other <em>Penicillium</em> spp. are established in Western Australia (APPDb 2011).</td>
<td>Unlikely: Species of <em>Penicillium</em> associated with berry rot are generally secondary invaders (Pearson &amp; Goheen 1988). Current management practices including good hygiene practices are likely to control additional <em>Penicillium</em> spp.(Pearson &amp; Goheen 1988).</td>
<td>no</td>
</tr>
<tr>
<td><em>Pestalotiopsis menezesiana</em> (Bres. &amp; Torrend) Bissett, 1983</td>
<td>Likely: Hosts of this fungus listed by Farr and Rossman (2011) are cultivated in Western Australia.</td>
<td>Likely: This fungus has been implicated in causing severe defoliation of grapevines and a rot of berries in India and has been shown to cause fruit rotting in Japan (Sergeeva et al. 2005).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Pestalotiopsis uvicola</em> (Speg.) Bissett, 1983</td>
<td>Likely: Hosts of this fungus listed by Farr and Rossman (2011) are cultivated in Western Australia.</td>
<td>Likely: This fungus has been shown to cause a rot of berries in Japan (Xu et al. 1999 cited in ADoA 2014) and in eastern Australia (Sergeeva et al. 2005).</td>
<td>yes</td>
</tr>
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<tbody>
<tr>
<td><em>Pilidiella castaneicola</em> (Ellis &amp; Everh)</td>
<td><strong>Likely</strong>: This fungus has a variety of hosts (ADoA 2014). Table and wine grapes are widely grown in Western Australia (DAFWA 2006; DAFWA 2014b).</td>
<td><strong>Likely</strong>: Causes white rot of grapevine berries reducing marketability and causes fruit rot of strawberries (ADoA 2014).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Phoma tuberculata</em> McAlpine, 1898</td>
<td><strong>Likely</strong>: <em>Vitis vinifera</em> is the only reported host of the fungus and is cultivated in Western Australia (CABI Bioscience 2011).</td>
<td><strong>Unlikely</strong>: There are very few reports of this fungus worldwide and it is not listed as a major pathogen of grapes (Pearson &amp; Goheen 1988; Nicholas et al. 1994; Rábai et al. 2008).</td>
<td>no</td>
</tr>
<tr>
<td>Organism</td>
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</tr>
<tr>
<td><em>Phomopsis viticola</em> (Sacc.) Sacc., 1915</td>
<td>Likely: <em>P. viticola</em> is established in temperate climatic regions throughout the viticultural world and has been reported in Africa, Asia, Australia (except Western Australia), Europe and North America (Hewitt &amp; Pearson 1988). Some areas of Western Australia have a suitable temperate climate.</td>
<td>Likely: <em>P. viticola</em> is a serious pathogen of grapes in several viticultural regions of the world (Hewitt &amp; Pearson 1988). Berry infection, either direct or via infected rachis tissues can occur throughout the growing season. Once inside green tissues of the berry, the fungus becomes latent (Erincik et al. 2002) and infected berries remain without symptoms until late in the season when the fruit matures (Ellis &amp; Erincik 2008).</td>
<td>yes</td>
</tr>
<tr>
<td><em>Strumella vitis</em> McAlpine, 1898</td>
<td>Not assessed</td>
<td>Unlikely: There are very few reports of this fungus worldwide and it is not listed as a major pathogen of grapes (Pearson &amp; Goheen 1988; Nicholas et al. 1994).</td>
<td>no</td>
</tr>
</tbody>
</table>
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</thead>
<tbody>
<tr>
<td><em>Torula viticola</em> Allesch.</td>
<td><strong>Unlikely:</strong> There is limited scientific literature on the fungus <em>T. viticola</em> and even for <em>Torula</em> species on <em>Vitis</em>. Records found in a search of the scientific literature were the report in Victoria (Washington 1983) and a report from Spain listing a <em>Torula</em> species as an endophyte recovered from <em>Vitis vinifera</em>. Endophytic fungi inhabit plant tissue without causing visible disease symptoms (González &amp; Tello 2011).</td>
<td><strong>Unlikely:</strong> There is limited scientific literature on the fungus <em>T. viticola</em>. The only record found detailed it on cane tissue of <em>V. vinifera</em> in Victoria. No other records of this fungus on grapevines in other countries or Australia were found in the general scientific literature. This indicates this fungus is not of economic consequence.</td>
<td>no</td>
</tr>
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</table>
### Table 15 Potential for establishment and economic consequences (pathogens)

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<th>Quarantine pest status</th>
</tr>
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<tbody>
<tr>
<td><strong>Viruses/Viroids</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Apscaviroid Australian grapevine viroid</em> (AGVd)</td>
<td><strong>Likely:</strong> Host plants listed are cultivated in WA and transmitted by mechanical means and through seed</td>
<td><strong>Unlikely:</strong> AGVd has not been reported as having any disease effects in grapevines. AGVd</td>
<td>no</td>
</tr>
<tr>
<td>Australian grapevine viroid</td>
<td>(Hadidi et al. 2003; Albrechtsen 2006).</td>
<td>produces little or no obvious disease symptoms (Martelli 1993; Hadidi et al. 2003).</td>
<td></td>
</tr>
<tr>
<td><em>Apscaviroid Grapevine yellow speckle viroid</em> (GYSVd) strain, 1</td>
<td><strong>Likely:</strong> Host plants listed are cultivated in WA and transmitted by grafting, abrasion and through seed</td>
<td><strong>Likely:</strong> Mixed infection of GYSVd-1 or GYSVd-2 and <em>Grapevine fanleaf virus</em> causes vein</td>
<td>yes</td>
</tr>
<tr>
<td>Grapevine yellow speckle viroid, 1</td>
<td>(Hadidi et al. 2003; Albrechtsen 2006).</td>
<td>banding that has detrimental effect on the yield of certain varieties (Szychowski et al. 1995).</td>
<td></td>
</tr>
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Table 15 Potential for establishment and economic consequences (pathogens)

<table>
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<tr>
<td><em>Apscaviroid Grapevine yellow speckle viroid</em> (GYSVd) strain, 2</td>
<td><strong>Likely</strong>: Host plants listed are cultivated in WA and transmitted by grafting, abrasion and through seed (Hadidi et al. 2003; Albrechtsen 2006).</td>
<td><strong>Likely</strong>: Mixed infection of GYSVd-1 or GYSVd-2 and <em>Grapevine fanleaf virus</em> causes vein banding that has detrimental effect on the yield of certain varieties (Szychowski et al. 1995).</td>
<td>yes</td>
</tr>
<tr>
<td>grapevine yellow speckle viroid, 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Fabavirus broad bean wilt virus</em>, 2</td>
<td><strong>Unlikely</strong>: At least one strain is transmitted in seed of <em>Vicia faba</em> but no record of seed transmission in <em>Vitis</em> spp. was found. (ADoA 2014).</td>
<td><strong>Not assessed</strong></td>
<td>no</td>
</tr>
<tr>
<td>broad bean wilt virus</td>
<td>Transmitted in a non-persistent manner by aphids. No records of acquisition from infected berries (ADoA 2014).</td>
<td></td>
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<tr>
<td>Hostuviroid <em>Hop stunt viroid</em> (HSVd) hop stunt viroid</td>
<td><strong>Likely:</strong> Host plants listed are cultivated in WA and transmitted by grafting, abrasion and through seed (Koltunow et al. 1988; Hadidi et al. 2003; Albrechtsen 2006).</td>
<td><strong>Likely:</strong> <em>Hop stunt viroid</em> is asymptomatic in grapevines and has not been shown to cause economic effects in grapevines. The viroid is only transmissible via the seed pathway and by mechanical means to other hosts including hops (Koltunow et al. 1988; Sano &amp; Shikata 1988). Strains of <em>Hop stunt viroid</em> have been shown to cause symptoms and even death of other host species (Sano &amp; Shikata 1988). Grapevines could represent natural reservoir from which the viroid can potentially be transmitted to other susceptible host crops (El-Dougdoug et al. 2010).</td>
<td>yes</td>
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<td><strong>Nepovirus Arabis mosaic virus</strong></td>
<td>Likely: Host plants listed are cultivated in WA and virus has reportedly been transmitted through seed (Murant 1970 cited in ADoA 2014).</td>
<td>Unlikely: The nematode vector of Arabis mosaic virus is absent and therefore there would be little to no spread of the virus (Borroto-Fernandez et al. 2009)</td>
<td>no</td>
</tr>
<tr>
<td><strong>Nepovirus Grapevine fanleaf virus (GFLV)</strong></td>
<td>Likely: Transmitted occasionally through seed also transmitted by a nematode vector (Xiphinema index) and by grafting (Habili et al. 2001; Martelli et al. 2001).</td>
<td>Likely: <em>Grapevine fanleaf virus</em> is the most serious virus disease of grapevines. The virus causes reduced number and size of bunches (Habili et al. 2001; Martelli et al. 2001).</td>
<td>yes</td>
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<td><em>Pospiviroid Citrus exocortis viroid</em> (CEVd) citrus exocortis viroid</td>
<td><strong>Likely</strong>: Host plants listed are cultivated in WA and transmitted by grafting, abrasion and through seed (Wah et al. 1997).</td>
<td><strong>Likely</strong>: No symptoms of disease observed when <em>Citrus exocortis viroid</em> infects grapevine (Hadidi et al. 2003). Rootstock of citrus that produces symptoms of CEVd are no longer used through the AusCitrus program (Barkley pers. comm.). Grapevines could represent natural reservoir from which the viroid can potentially be transmitted to other susceptible host crops (El-Dougdoug et al. 2010).</td>
<td>yes</td>
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<td><strong>Nectrovirus Tobacco necrosis viruses (TNV-?)</strong></td>
<td><strong>Unlikely:</strong> <em>Tobacco necrosis viruses</em> have been reported in Qld (Teakle 1988; Plant Health Australia 2001b) and Vic. (Finlay and Teakle 1969; Teakle 1988), but not on grapevine. It is not known if the species or strain that infects grapevine is present in Australia (ADoA 2014).</td>
<td><strong>Not assessed</strong></td>
<td>no</td>
</tr>
<tr>
<td><strong>Vitivirus Grapevine B virus (GVB)</strong></td>
<td><strong>Unlikely:</strong> Not seed transmitted; transmitted by grafting; transmitted by the mealy bugs <em>Planococcus ficus</em>, <em>Pseudococcus longispinus</em> and <em>Ps. affinis</em> (Biosecurity Australia 2010). Unlikely to be co-transported with a vector insect or to be transmitted from imported fruit to a suitable host plant.</td>
<td><strong>Not assessed</strong></td>
<td>no</td>
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<tr>
<td><em>Vitivirus: Grapevine virus d</em> (GVD)</td>
<td><strong>Unlikely:</strong> No reports of natural spread (DAFF 2013). Unlikely to be co-transported with a vector insect or to be transmitted from imported fruit to a suitable host plant (DAFF 2013).</td>
<td><strong>Not assessed</strong></td>
<td>no</td>
</tr>
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