TECHNICAL ISSUES PAPER

Import risk analysis (IRA) for importation of table grapes (Vitis vinifera L.) from Republic of Chile

September, 2002

AGRICULTURE, FISHERIES AND FORESTRY - AUSTRALIA

Foreword

TABLE OF CONTENTS

GLOSSARY OF TERMS AND ABBREVIATIONS

AFFA	Agriculture, Fisheries and Forestry - Australia
ALOP	appropriate level of protection
APHIS	Animal and Plant Health Inspection Service
AQIS	Australian Quarantine and Inspection Service
Area	an officially defined country, part of a country or all or parts of several countries
Biosecurity Australia	an agency within the Commonwealth Department of Agriculture, Fisheries and Forestry – Australia. Biosecurity Australia protects consumers and animal and plant health, and facilitates trade, by providing sound scientifically based and cost effective quarantine policy
Control (of a pest)	suppression, containment or eradication of a pest population
DPIE	Department of Primary Industries and Energy (former name of AFFA)
Endangered area	an area where ecological factors favour the establishment of a pest whose presence in the area will result in economically important loss
Entry (of a pest)	movement of a pest into an area where it is not yet present, or is present but not widely distributed and being officially controlled
Entry potential	likelihood of the entry of a pest
Establishment	the perpetuation, for the foreseeable future, of a pest within an area after entry
Establishment potential	likelihood of the establishment of a pest
FAO	Food and Agriculture Organization of the United Nations
ICA	Interstate Certification Assurance
ICON	AQIS Import Conditions database
Introduction potential	likelihood of the introduction of a pest
Introduction	entry of a pest resulting in its establishment
IPPC	International Plant Protection Convention, as deposited in 1951 with FAO in Rome and as subsequently amended
IRA	import risk analysis
ISPM	International Standard on Phytosanitary Measures
National Plant Protection	

Organisation	official service established by a government to discharge the functions specified by the IPPC
Non-quarantine pest	pest that is not a quarantine pest for an area
Official	established, authorised or performed by a National Plant Protection Organization
Official control (of a regulated pest)	the active enforcement of mandatory phytosanitary regulations and the application of mandatory phytosanitary procedures with the objective of eradication or containment of quarantine pests or for the management of regulated non-quarantine pests
OIE	International Office of Epizootics
Pathway	any means that allows the entry or spread of a pest
PBPM	Plant Biosecurity Policy Memorandum
Pest	any species, strain or biotype of plant, animal, or pathogenic agent, injurious to plants or plant products
Pest categorisation	the process for determining whether a pest has or has not the characteristics of a quarantine pest or those of a regulated non-quarantine pest
Pest free area	an area in which a specific pest does not occur as demonstrated by scientific evidence and in which, where appropriate, this condition is being officially maintained
Pest risk analysis	the process of evaluating biological or other scientific evidence to determine whether a pest should be regulated and the strength of any phytosanitary measures to be taken against it
Pest risk assessment	determination of whether a pest is a quarantine pest and evaluation of its introduction potential
Pest risk assessment (for quarantine pests)	evaluation of the probability of the introduction and spread of a pest and of the associated potential economic consequences
Pest risk management	the decision-making process of reducing the risk of introduction of a quarantine pest
Pest risk management (for quarantine pests)	evaluation and selection of options to reduce the risk of introduction and spread of a pest
Phytosanitary measure	any legislation, regulation or official procedure having the purpose to prevent the introduction and/or spread of quarantine pests

Phytosanitary regulation	official rule to prevent the introduction and/or spread of quarantine pests, by regulating the production, movement or existence of commodities or other articles, or the normal activity of persons, and by establishing schemes for phytosanitary certification
PRA	pest risk analysis
PRA area	area in relation to which a pest risk analysis is conducted
QDPI	Queensland Department of Primary Industries
QP	Quarantine Proclamation
Quarantine pest	a pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled
Regulated non-quarantine pest	a non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party
SAG	Servicio Agricola y Ganadero (Chilean Agricultural Service)
Spread	expansion of the geographical distribution of a pest within an area
Spread potential	likelihood of the spread of a pest
SPS	Sanitary and Phytosanitary
SPS Agreement	WTO Agreement on the Application of Sanitary and Phytosanitary Measures
USA	United States of America
USDA	United States Department of Agriculture
WTO	World Trade Organization

EXECUTIVE SUMMARY

The Commonwealth Department of Agriculture, Fisheries and Forestry - Australia (AFFA) is considering the importation of table grapes from the Republic of Chile. The import risk analysis (IRA) has been initiated according to *The AQIS Import Risk Analysis Process Handbook* (the Handbook) (AQIS, 1998).

This Technical Issues Paper contains the following sections:

- Biosecurity Australia’s framework for quarantine policy and for IRA and the international framework for trade in animal- and plant-derived products
- Pest risk analysis (PRA) methodology
- Background to this IRA
- Current quarantine policy for importation of table grapes
- Results of pest categorisation
- An outline of further steps in the IRA process.

The introductory sections provide information that is fundamental to understanding the national and international framework under which import applications from other countries are considered. Information specific to the viticultural industry in Australia and Chile is covered in the section entitled ‘Proposal to import table grapes from Chile’.

Biosecurity Australia has identified 140 pests and diseases associated with Chilean table grapes. Of these, 89 are present in Australia and do not need to be considered further in the IRA. Of the remaining 51 pests and diseases not present in Australia or present but under official control, 24 are potentially associated with the import pathway (table grape clusters/bunches). These 24 pests and diseases will be considered further in the IRA. In addition, 33 species of weeds produce reproductive material that may contaminate table grape clusters. The next stage of the IRA will involve determining the potential of these pests to establish and spread in Australia and the economic consequences of their entry. This part of the risk assessment will be covered in the Draft IRA.

This *Technical Issues Paper* precedes publication of a draft and subsequently a final IRA document. The draft IRA document will cover technical issues related to pest risk assessment and pest risk management options, and will give preliminary ideas about which risk management measures will achieve Australia’s appropriate level of protection (ALOP).

Stakeholders are strongly encouraged to contribute to the IRA by providing relevant technical information and raising issues as early as possible, preferably while commenting on the *Technical Issues Paper* or during meetings with Biosecurity Australia. After considering all technical issues, including stakeholder comments on the draft IRA document, Biosecurity Australia will finalise the IRA recommendations in line with Australia's highly conservative ALOP and international rights and obligations under the SPS Agreement. The final IRA will include the same elements with any necessary revisions, and a description of quarantine conditions for importation of table grapes from Chile.

Biosecurity Australia will submit its recommendations to the Director of Animal and Plant Quarantine (the Director) for consideration. The Director will consider the recommendations and make the final determination. The Director's determination and the Final IRA report will be sent to all stakeholders. Any stakeholder of the opinion that the process outlined in the Handbook has not been properly followed, including that the analysis failed to consider a significant body of relevant scientific or technical information, may appeal to the Director. If the appeal is upheld, Biosecurity Australia will rectify the deficiency. If the appeal is rejected, the policy will be adopted.

1. BIOSECURITY FRAMEWORK

1.1 Biosecurity in Australia

1.1.1 Legislative framework

Agriculture Fisheries and Forestry - Australia's (AFFA) objective is to adopt biosecurity policies that provide the health safeguards required by government policy in the least trade-restrictive way and that are, where appropriate, based on international standards. In developing and reviewing quarantine (or biosecurity) policies, disease risks associated with importations may be analysed using import risk analysis — a structured, transparent and science-based process.

The *Quarantine Act* and its subordinate legislation, including the *Quarantine Proclamation 1998* (QP 1998), are the legislative basis of human, animal and plant biosecurity in Australia. The *Quarantine Amendment Act 1999*, which commenced in June/July 2000, incorporates major changes to the *Quarantine Act* as recommended in the report of the Australian Quarantine Review Committee (AQRC, 1996).

Section 4 of the *Quarantine Act* defines the scope of quarantine as follows:

In this Act, quarantine includes, but is not limited to, measures:

- *for, or in relation to, the examination, exclusion, detention, observation, segregation, isolation, protection, treatment and regulation of vessels, installations, human beings, animals, plants or other goods or things*
- *having as their object the prevention or control of the introduction, establishment or spread of diseases or pests that will or could cause significant damage to human beings, animals, plants, other aspects of the environment or economic activities*

Quarantine Risk

The concept of level of quarantine (or biosecurity) risk has been introduced as the basis of quarantine decision-making. When making decisions under the *Quarantine Act*, decision-makers must consider the level of quarantine risk and must take prescribed actions to manage the risk if it is unacceptably high. Section 5D of the *Quarantine Act* includes harm to the environment as a component of the level of quarantine risk.

Section 5D: level of quarantine risk

A reference in this Act to a level of quarantine risk is a reference to:

(a) *the probability of:*

(i) *a disease or pest being introduced, established or spread in Australia or the Cocos Islands; and*

(ii) *the disease or pest causing harm to human beings, animals, plants, other aspects of the environment, or economic activities; and*

(b) the probable extent of the harm.

Quarantine Proclamation

Subsection 13(1) of the *Quarantine Act* provides that the Governor-General in Executive Council may, by proclamation, prohibit the importation into Australia of any articles or things likely to introduce, establish or spread any disease or pest affecting people, animals or plants. The Governor-General may apply this power of prohibition generally or subject to any specified conditions or restrictions.

QP 1998 is the principal legal instrument used to control the importation into Australia of goods of quarantine (or biosecurity) interest. A wide range of goods is specified in *QP 1998* including animals, plants, animal and plant products, micro-organisms, and certain other goods, which carry a high risk if uncontrolled importation is allowed — e.g. soil, water, vaccines, and feeds.

For articles or things prohibited by proclamation, the Director of Animal and Plant Quarantine may permit entry of products on an unrestricted basis or subject to compliance with conditions, which are normally specified on a permit. An import risk analysis provides the scientific and technical basis for biosecurity policies that determine whether an import may be permitted and, if so, the conditions to be applied.

The matters to be considered when deciding whether to issue a permit are set out in Section 70 of *QP 1998* as follows:

70 Things a Director of Quarantine must take into account when deciding whether to grant a permit for importation into Australia

(1) In deciding whether to grant a permit to import a thing into Australia or the Cocos Islands, or for the removal of a thing from the Protected Zone or the Torres Strait Special Quarantine Zone to the rest of Australia, a Director of Quarantine:

(a) must consider the level of quarantine risk if the permit were granted; and

(b) must consider whether, if the permit were granted, the imposition of conditions on it would be necessary to limit the level of quarantine risk to one that is acceptably low; and

(c) may take into account anything else that he or she knows that is relevant.

The matters include the level of quarantine risk (see above), whether the imposition of conditions would be necessary to limit the quarantine risk to a level that would be acceptably low, and anything else known to the decision maker to be relevant.

Environment

While protection of the natural and built environment has always been an objective of Australian quarantine policy and practice, recent amendments to the *Quarantine Act 1908* make explicit the responsibility of quarantine officers to consider impact on the environment when making decisions. In particular, the scope of quarantine (as described in Section 4 of the *Quarantine Act*), and the level of quarantine risk (as described in Section 5D of the *Quarantine Act*), includes explicit reference to the environment.

Environment is defined in Section 5 of the *Quarantine Act* as:

> *... all aspects of the surroundings of human beings, whether natural surroundings or surroundings created by human beings themselves, and whether affecting them as individuals or in social groupings.*

When undertaking an import risk analysis, Biosecurity Australia fully takes into account the risk of harm to the environment to ensure that the biosecurity policies developed reflect the Australian Government's approach to risk management. This is achieved through the involvement of Environment Australia in decisions on the import risk analysis work program and, for particular import risk analyses, discussions on the scope, the likely risks, and the expertise, which may be required to address those risks. Environment Australia may identify additional technical issues that it believes should be considered during an import risk analysis, and may nominate officers with relevant expertise who would be available to participate in the import risk analysis.

1.1.2 Policy framework

The primary purpose of biosecurity is to protect Australia from the entry, establishment and spread of unwanted pests and diseases that may cause social, economic or environmental damage, while minimising the restrictions on the entry of agricultural commodities.

Due to Australia's unique and diverse flora and fauna and the value of its agricultural industries, successive Australian Governments have maintained a highly conservative but not a zero-risk approach to the management of biosecurity risks. This approach is evident in the strictness of all biosecurity-related activities, including policies on imported commodities, procedures at the border and operations against incursions of pests and diseases.

Recent inquiries into Australia's biosecurity regime have recognised that it is impossible in practice to operate a zero-risk biosecurity regime. In 1979, the Senate Standing Committee on Natural Resources stressed that there is no such thing as a zero-risk quarantine policy, and it believed that Australia's approach should be better described as '*scientific evaluation of acceptable risk*'. In 1988, the Lindsay review of Australian quarantine concluded that '*a no risk policy is untenable and undesirable and should be formally rejected*'. In 1996, the Senate Rural and Regional Affairs and Transport Committee was of the view that a zero-risk approach was unrealistic and untenable, and that its currency only demonstrated that the concepts of risk assessment and risk management were widely misunderstood. These themes were repeated in the AQRC report. In its 1997 response to that report, the Government confirmed a managed risk approach.

Import risk analysis provides the basis for considering import applications for the importation of animals and animal-derived products, and plants and plant-derived products. In keeping with the scope of the *Quarantine Act* and Australia's international obligations, only factors relevant to the evaluation of quarantine risk (ie. the risk associated with the entry, establishment and spread of unwanted pests and diseases) are considered in the import risk analysis. The potential competitive economic impact of prospective imports is not within the scope of the import risk analysis process, and any discussion on industry support mechanisms would need to remain quite separate from the import risk analysis.

1.2 WTO and Import Risk Analysis

One of the principal objectives in developing the administrative framework outlined for import risk analysis was to ensure that it complied with Australia's international rights and obligations.

These derive principally from the *SPS Agreement*, although other WTO Agreements (including the *Agreement on Technical Barriers to Trade* - the TBT Agreement) may be relevant in certain circumstances. Specific international guidelines on risk analysis developed under IPPC and by OIE are also relevant.

The *SPS Agreement* applies to measures designed to protect human, animal and plant life and health from pests and diseases, or a country from pests, and which may directly or indirectly affect international trade. It also recognises the right of WTO Member countries to determine the level of protection they deem appropriate and to take the necessary measures to achieve that protection. Sanitary (human and animal health) and phytosanitary (plant health) measures apply to trade in or movement of animal and plant based products within or between countries.

In the *SPS Agreement*, SPS measures are defined as any measures applied:

- to protect animal or plant life or health within the territory of the Member from risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms;
- to protect human or animal life or health within the territory of the Member from risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages or feed-stuffs;
- to protect human life or health within the territory of the Member from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests; and
- to prevent or limit other damage within the territory of the Member from the entry, establishment or spread of pests.

The key provisions of the *SPS Agreement* are as follows:

- An importing country has the sovereign right to adopt measures to achieve the level of protection it deems appropriate (its appropriate level of protection, or ALOP) to protect human or animal life or health within its territory, but such a level of protection must be consistently applied in different situations.

- An SPS measure must be based on scientific principles and not be maintained without sufficient evidence.
- In applying SPS measures, an importing country must avoid arbitrary or unjustifiable distinctions in levels of protection, if such distinctions result in discrimination or a disguised restriction on international trade.
- An SPS measure must not be more trade restrictive than necessary to achieve an importing country's ALOP, taking into account technical and economic feasibility.
- An SPS measure should be based on an international standard, guideline or recommendation, where these exist, except to the extent that there is scientific justification for a more stringent measure which is necessary to achieve an importing country's ALOP.
- An SPS measure conforming to an international standard, guideline or recommendation is presumed to be necessary protect human, animal or plant life or health, and to be consistent with the *SPS Agreement*.
- Where an international standard, guideline or recommendation does not exist or where, in order to meet an importing country's ALOP, a measure needs to provide a higher level of protection than accorded by the relevant international standard, such a measure must be based on a risk assessment; the risk assessment must take into account available scientific evidence and relevant economic factors.
- When there is insufficient scientific evidence to complete a risk assessment, an importing country may adopt a provisional measure(s) by taking into account available pertinent information; additional information must be sought to allow a more objective assessment and the measure(s) reviewed within a reasonable period.
- An importing country must recognise the measures of other countries as equivalent, if it is objectively demonstrated that the measures meet the importing country's ALOP.

The rights and obligations in the *SPS Agreement* must be read as a whole. The articles must be interpreted in relation to each other. That is, the articles do not stand-alone.

In many instances, the biosecurity policies Biosecurity Australia develops are based on the relevant international standards, guidelines and recommendations. In certain instances and in conformity with rights under the *SPS Agreement*, Australia has not adopted such international norms because to do so would result in an unacceptably high level of risk of disease or pest entry and establishment. Instead, the policies are based on a risk analysis.

The text of the *SPS Agreement* can be found at the WTO Internet site.[1]

[1] Available at http://www.wto.org/english/docs_e/docs_e.htm

The following issues are discussed in greater detail:

- notification obligations;
- use of international standards;
- equivalence;
- risk assessment;
- appropriate level of protection; and
- consistency in risk management.

1.2.1 Notification obligations

The WTO SPS Committee has been established to oversee the implementation of the *SPS Agreement*, and to provide a forum for the discussion of any trade issues related to biosecurity policies. Like other WTO committees, all WTO Members have the right to participate in the work and decision making of the SPS Committee; decisions are taken by consensus. The SPS Committee has accepted, as observers, the Codex Alimentarius Commission (Codex), International Office of Epizootics (OIE) and IPPC, as well as other international and regional intergovernmental organisations with activities in food safety, animal health and plant protection to maximise knowledge of and participation in its work.

The SPS Committee normally meets three times a year at the WTO headquarters in Geneva, Switzerland.

In addition to considering any specific trade concerns raised by governments, the *SPS Agreement* has set specific tasks for the Committee. One of these is to monitor the extent to which governments are using internationally developed standards as the basis for their requirements for imported products. Countries identify cases where the non-use, or non-existence, of an appropriate international standard is causing difficulties for international trade. After consideration by the SPS Committee, these concerns may be brought to the attention of the relevant standard-setting organisations.

Under the *SPS Agreement*, Members are required to notify WTO of new sanitary or phytosanitary regulations or modifications to existing regulations that are not substantially the same as the content of an international standard and that may have a significant effect on international trade. Australia notifies new measures and comments on draft policies proposed by other countries through the SPS Notification Point in AFFA.

1.2.2 Use of international standards

The *SPS Agreement* has conferred special status on three international organisations by requiring WTO Members to harmonise their sanitary and phytosanitary measures on the standards, guidelines and recommendations produced by those organisations unless there is scientific justification for a more stringent measure.

The three international organisations are referenced in Annex A of the *SPS Agreement* as follows:

- *for food safety, the standards, guidelines and recommendations established by the Codex Alimentarius Commission relating to food additives, veterinary drug and pesticide residues, contaminants, methods of analysis and sampling, and codes and guidelines of hygienic practice;*
- *for animal health and zoonoses, the standards, guidelines and recommendations developed under the auspices of the International Office of Epizootics; and*
- *for plant health, the international standards, guidelines and recommendations developed under the auspices of the Secretariat of the International Plant Protection Convention in co-operation with regional organizations operating within the framework of the International Plant Protection Convention.*

International Plant Protection Convention

IPPC is a multilateral treaty deposited with the Director-General of the Food and Agriculture Organization of the United Nations. IPPC provides a framework and forum for international co-operation, standards harmonisation and information exchange on plant health in collaboration with regional and national plant protection organisations (RPPOs and NPPOs). Its prime purpose is to secure common and effective action to prevent the spread and introduction of pests of plants and plant products and to promote measures for their control.

Currently, 117 governments are contracting parties to IPPC.

The New Revised Text of IPPC enabled the establishment of an Interim Commission on Phytosanitary Measures to serve as IPPC's new governing body. Membership in the Interim Commission is open to all contracting parties of IPPC. The Interim Commission meets annually to establish priorities for standard setting and harmonisation of phytosanitary measures in co-ordination with the IPPC Secretariat.

The functions of the Interim Commission are to provide direction to the work program of the IPPC Secretariat and promote the full implementation of the objectives of the Convention and, in particular, to:

- review the state of plant protection in the world and the need for action to control the international spread of pests and control their introduction into endangered areas;
- establish and keep under review the necessary institutional arrangements and procedures for the development and adoption of international standards, and to adopt international standards;
- establish rules and procedures for the resolution of disputes; and
- co-operate with other relevant international organisations.

The new IPPC and ISPM No 11 (*Pest Risk Analysis for Quarantine pests*) adopt a similar approach to that of OIE and note the importance of documenting all steps in the risk analysis process.

1.2.3 Equivalence

Article 4 of the *SPS Agreement* states that:

> *Members shall accept the sanitary or phytosanitary measures of other Members as equivalent, even if these measures differ from their own or from those used by other Members trading in the same product, if the exporting Member objectively demonstrates to the importing Member that its measures achieve the importing Member's appropriate level of sanitary or phytosanitary protection.*

Members must accept the SPS measures of other Members, as equivalent to their own if the latter can demonstrate objectively that their measures provide the level of protection required by the importing country.

Article 5.6 of the *SPS Agreement* states that:

Often there are several alternative measures that may either singly or in combination achieve the ALOP. In choosing among such alternatives, a Member should apply measures that are not more trade-restrictive than necessary to achieve its ALOP, taking into account technical and economic feasibility.

1.2.4 Risk assessment

Articles 5.1 to 5.3 of the *SPS Agreement* outline the requirements that Members should follow when carrying out an import risk assessment.

Article 5.1 provides a basic statement of the obligation:

> *Members shall ensure that their sanitary or phytosanitary measures are based on an assessment, as appropriate to the circumstances, of the risks to human, animal or plant life or health, taking into account risk assessment techniques developed by the relevant international organisations*

Annex A of the *SPS Agreement* contains two definitions of risk assessment; the following is the definition applicable to biosecurity assessments:

> *The evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of an importing Member according to the sanitary or phytosanitary measures which might be applied, and of the associated potential biological and economic consequences*

On the basis of this definition, the Appellate Body examining Australia’s appeal against the dispute settlement panel’s finding on Australia’s prohibition of imports of Canadian salmon considered that a risk assessment within the meaning of Article 5.1 must:

- identify the hazards whose entry, establishment or spread within its territory a Member wants to prevent, as well as the associated potential biological and economic consequences;
- evaluate the likelihood of entry, establishment or spread of these hazards, as well as the associated potential biological and economic consequences; and
- evaluate the likelihood of entry, establishment or spread of these hazards according to the SPS measures that might be applied; measures which might be applied are those which reduce the risks to the appropriate level, with the aim of being least trade restrictive.

The Appellate Body believed that, for a risk assessment to fall within the meaning of Article 5.1 and the first definition in paragraph 4 of Annex A of the Agreement, it is not sufficient that it conclude that there is a 'possibility' of entry, establishment or spread of diseases and their associated biological and economic consequences. That is, an assessment must evaluate the 'likelihood' (the 'probability') of entry, establishment or spread of diseases and their associated biological and economic consequences. Furthermore, likelihood should be evaluated without and then with any SPS measures that might be required.

Article 5.2 outlines factors that should be considered when assessing the risks associated with a proposed importation. Specifically, it states that:

> *In the assessment of risks Members shall take into account available scientific evidence; relevant processes and production methods; relevant inspection, sampling and testing methods; prevalence of specific diseases or pests; existence of pest- or disease-free areas; relevant ecological or environmental conditions; and quarantine or other treatment*

This paragraph emphasises the need to consider a wide range of factors in both the importing and exporting country.

Article 5.3 describes the need to include a consequence assessment in a risk assessment, and lists dimensions that should be considered when assessing 'potential damage' arising from a disease or pest incursion. Specifically, it states that:

> *Members shall take into account as relevant economic factors; the potential damage in terms of loss of production or sales in the event of the entry, establishment or spread of a pest or disease; the cost of control or eradication in the territory of the importing Member*

This list of 'relevant economic factors' may be viewed as the bare minimum that must be considered if an analysis is to comply with the terms of the *SPS Agreement*. In addition, both the *OIE Code* and IPPC standards for risk analysis have outlined factors that should be considered when assessing consequences. These two standards also stress the need to consider the 'likely magnitude' of consequences — that is, to base an assessment of consequences on the likelihood of various levels of damage in the importing country. Finally, Article 5.3 states that Members should consider '... *the relative cost-effectiveness of alternative approaches to limiting risks* ...'. This is an issue that should be explored during risk management. Among factors that may not be taken into account are those relating to import competition.

The environmental and ecological consequences of pest or disease introduction are legitimate considerations in a risk assessment. The *SPS Agreement* provides a basic right to take measures to protect animal or plant life or health (Article 2). In Annex A, 'animal' is defined to include fish and wild fauna; and 'plant' to include forests and wild flora.

Additional to the economic factors identified in Article 5.3, the definition of risk assessment in Annex A, paragraph 4 (" ... *evaluation of the likelihood of entry, establishment or spread of a pest or disease … and of the associated potential biological and economic consequences* ...") provides for general consideration of the biological consequences, including to the environment. The environment is included in paragraph 1(d), which states that an SPS measure is one that is applied to " ... *prevent or limit other damage to a country from the entry, establishment or spread of pests* ...".

1.2.5 Appropriate level of protection

The *SPS Agreement* defines '*appropriate level of sanitary or phytosanitary protection*' as the level of protection deemed appropriate by the Member establishing a sanitary or phytosanitary measure to protect human, animal or plant life or health within its territory. The *SPS Agreement* notes that many Members also refer to this concept as the '*acceptable level of risk*'. In setting their ALOP, Members are to take into account the objective of minimising negative trade effects (Article 5.4).

Determination of Australia's ALOP is an issue for government in consultation with the community — it is not a prerogative of WTO. ALOP reflects government policy that is affected by community expectations; it is a societal value judgement to which AFFA contributes by providing technical information and advice. It is important to note that the *SPS Agreement* does not require a Member to have a scientific basis for its ALOP determination.

ALOP can be illustrated using a *risk estimation matrix* (Table 1). The cells of this matrix describe the product of likelihood and consequences — termed 'risk'.

When interpreting the risk estimation matrix it should be remembered that the descriptors for each axis are similar ('low', 'moderate', 'high', etc), the vertical axis refers to likelihood and the horizontal axis refers to consequences.

One implication of this is that a 'negligible' probability combined with 'extreme' consequences, is not the same as an 'extreme' probability combined with 'negligible' consequences - that is, that the matrix is not symmetrical. Another implication is that 'risk' is expressed in the same units as are used to estimate consequences – that is, risk is not a likelihood.

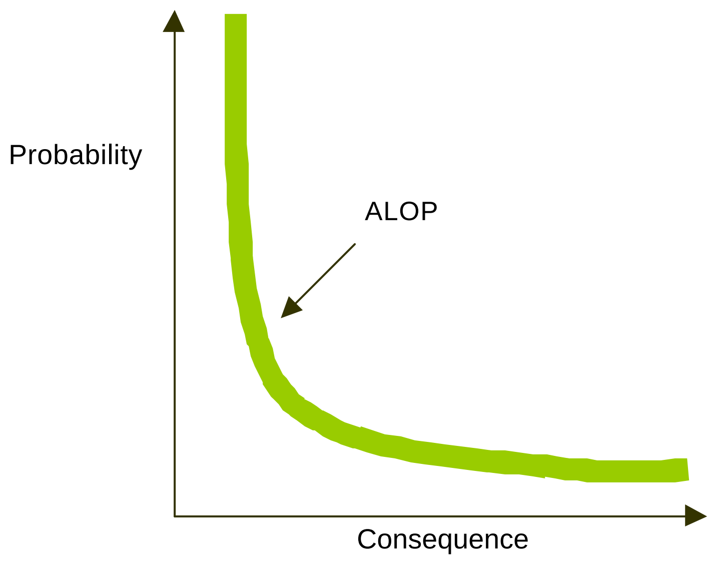
Table 1: Risk estimation matrix

Likelihood of entry, establishment and spread						
High likelihood	Negligible risk	Very low risk	Low risk	Moderate risk	High risk	Extreme risk
Moderate	Negligible risk	Very low risk	Low risk	Moderate risk	High risk	Extreme risk
Low	Negligible risk	Negligible risk	Very low risk	Low risk	Moderate risk	High risk
Very low	Negligible risk	Negligible risk	Negligible risk	Very low risk	Low risk	Moderate risk
Extremely low	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Very low risk	Low risk
Negligible likelihood	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Very low risk
	Negligible impact	*Very low*	*Low*	*Moderate*	*High*	*Extreme impact*

Consequences of entry, establishment and spread

The band of cells in Table 1 marked 'very low risk' represents Australia's ALOP, or tolerance of loss. This band of cells represents an approximation of a continuous 'iso-risk curve' — a curve that will be asymptotic at the minimum level of consequences considered to be 'acceptable' (which, in Australia's case, is 'very low') and at a likelihood that tends toward zero. The principle of an iso-risk curve is illustrated in Figure 1.

Figure 1: Theoretical iso-risk curve



1.2.6 Consistency in risk management

Article 5.5 states:

> *With the objective of achieving consistency in the application of the concept of appropriate level of sanitary or phytosanitary protection against risks to*

human life or health, or to animal and plant life or health, each Member shall avoid arbitrary or unjustifiable distinctions in the levels it considers to be appropriate in different situations, if such distinctions result in discrimination or a disguised restriction on international trade

Members are obliged to avoid arbitrary or unjustifiable distinctions in the levels of protection applied in different situations, if such distinctions result in discrimination or a disguised restriction on international trade. This obligation reflects the objective of consistency in applying the concept of ALOP against risks to human, animal and plant life or health — that is, consistency in risk management. In other words, it is not open to a Member to arbitrarily vary its attitude to the acceptance of risk from one situation to another, where the situations are comparable.

Consistency in risk management is achieved in Biosecurity Australia's IRA process by using the risk estimation matrix (Table 1).

2. METHOD FOR PEST RISK ANALYSIS

2.1 Overview of the IPPC approach to Pest Risk Analysis

The technical component of an IRA for plants or plant products is termed as 'pest risk analysis', or PRA. In accordance with ISPM No 11 (*Pest Risk Analysis for Quarantine Pests*), a PRA[2] comprises three discrete stages:

- Stage 1: Initiation of the pest risk analysis
- Stage 2: Risk assessment
- Stage 3: Risk management.

The *initiation* of a risk analysis involves the identification of the pest(s) and pathways of concern that should be considered for analysis. *Risk assessment* comprises pest categorisation, assessment of the probability of introduction and spread, and assessment of the potential economic consequences (including environmental impacts). *Risk management* describes the evaluation and selection of options to reduce the risk of introduction and spread of a pest. Because the key objective of this *Technical Issues Paper* is to document the approach to and preliminary results of pest categorisation, this component of the PRA is discussed in further detail.

Under ISPM No 11, pest categorisation describes the process for determining whether a pest has or does not have the characteristics of a quarantine pest, or those of a regulated non-quarantine pest. Therefore, the objective of pest categorisation is to

[2] PRA is used throughout this document as an abbreviation of Pest Risk Analysis. AFFA employs the term PRA to describe the technical component of an import risk analysis.

screen an exhaustive pest list to identify those that require an in-depth examination of the likelihood and consequences of introduction and spread.

2.2 Elements of Pest Categorisation

In accordance with ISPM No 11, pest categorisation is based on the following elements or steps:

- Identity of the pest
- Presence or absence in the PRA area
- Regulatory status
- Potential for establishment or spread in the PRA area
- Potential for economic consequences (including environmental consequences) in the PRA area.

A description of these elements of pest categorisation from ISPM No 11 is given below.

2.1.1 Identity of the pest

The identity of the pest should be clearly defined to ensure that the assessment is being performed on a distinct organism, and that biological and other information used in the assessment is relevant to the organism in question. If this is not possible because the causal agent of particular symptoms has not yet been fully identified, then it should have been shown to produce consistent symptoms and to be transmissible.

The taxonomic unit for the pest is generally species level. The use of a higher or lower taxonomic level should be scientifically justifiable. For levels below the species, this should include evidence for differences in virulence, host range and/or vector relationships that are significant enough to affect phytosanitary status.

In cases where a vector is involved, the vector may also be considered a pest to the extent that it is associated with the causal organism and is required for transmission of the pest.

2.1.2 Presence or absence in the PRA area

The pest should be absent from all of the PRA area or a defined part of the PRA area.

2.1.3 Regulatory status

If the pest is present but not widely distributed in the PRA area, it should be under official control or expected to be under official control in the near future.

2.1.4 Potential for establishment or spread in the PRA area

Evidence should be available to support the conclusion that the pest could become established or could spread in the PRA area. The PRA area should have ecological/climatic conditions, including those in protected conditions, suitable for the establishment and spread of the pest. Where relevant, host species (or near relatives), alternate hosts and vectors should be present in the PRA area.

2.1.5 Potential for economic consequences in the PRA area

It should be clear that the pest is likely to have an unacceptable economic impact (including environmental impact) in the PRA area.

3. PROPOSAL TO IMPORT TABLE GRAPES FROM CHILE

3.1 Background

The first formal Plant Quarantine Technical Meeting between Chile and Australia was held between the Chilean Agriculture Service (Servicio Agricola y Ganadero: SAG) and AQIS on 23 July 1993. The Chilean and Australian Governments signed a Memorandum of Understanding in October 1993, initiating cooperation in plant protection to facilitate trade in plant products between the two countries.

In May 1995, AQIS received an application from SAG seeking access to Australia for seven commodities (apples, cherries, nectarines, peaches, pears, plums and table grapes) from Chile. In 1995, SAG provided AQIS with information on some of the pests associated with these crops but this information was not sufficient to initiate a pest risk assessment (PRA).

In July 1996, SAG advised AQIS that table grapes should be given a high priority and provided further information on pests and diseases to facilitate a PRA. AQIS advised stakeholders on 2 December 1998 that an import access proposal for table grapes had been received from Chile.

AQIS proposed to stakeholders on 5 February 1999 that the proposal be considered using a routine process, as outlined in the *AQIS Import Risk Analysis Handbook*. Following consideration of stakeholder comments, AQIS advised stakeholders of the decision to proceed with the IRA using the routine approach on 15 April 1999.

Changes to the internal structure of the Department of Agriculture, Fisheries and Forestry – Australia (AFFA) resulted in the formation of Biosecurity Australia on 6 October 2000. Biosecurity Australia is responsible for the IRA function that was formally the responsibility of AQIS.

Stakeholders were advised that an IRA for the importation of table grapes from Chile was being conducted by Biosecurity Australia in Plant Biosecurity Policy Memorandum (PBPM) 2001/05 of March 2001.

Biosecurity Australia conducted a review of the import risk analysis process in 2001, as advised in Plant Biosecurity Policy Memorandum 2001/21 on 28 September 2001. The initial paper for consultation with stakeholders will now be a technical issues paper for all IRAs, providing an opportunity for early stakeholder input into the science. This paper will list the pests and diseases that the IRA team has identified as needing to be assessed and seek stakeholder comment including any additional pests and diseases of concern.

3.2 Administration

3.2.1 Timetable

The draft IRA is tentatively scheduled to be completed by the end of 2002. Further steps in the IRA process are outlined in section 5 of this paper. Given the nature of the task, Biosecurity Australia considers it is not possible at this stage to give definite times for the completion of these steps. Throughout the process, Biosecurity Australia will use memoranda to advise stakeholders in a timely manner of key forthcoming events.

3.2.2 Scope

This IRA considers quarantine risks that may be associated with the importation of clusters (bunches) of table grapes (*Vitis vinifera* L.) into Australia from Chile for human consumption. In this IRA, table grapes are defined as 'table grape clusters', which include peduncles, laterals, rachis, pedicels and berries but no other plant parts. The produce will have been cultivated, harvested, packed and transported to Australia under commercial conditions.

3.3 Australia's Current Quarantine Policy for Imports of Table Grapes

3.3.1 International quarantine policy

New Zealand

Currently, Australia allows importation of table grapes from New Zealand. Any produce from grapevines not grown in glasshouses is subject to mandatory fumigation with methyl bromide at the rate of 32 g/m^3 for 3 hours at 21°C. Table grapes from glasshouses must be accompanied by a Phytosanitary Certificate endorsed "Glasshouse-grown free from phylloxera". Glasshouse-grown consignments that are not accompanied by a Phytosanitary Certificate are also subject to mandatory fumigation with methyl bromide at the rate of 32 g/m^3 for 3 hours at 21°C. All imported consignments of table grapes are subject to 'General Requirements for All Fruits and Vegetables,' as outlined in the AQIS Import Conditions database (ICON) website (http://www.aqis.gov.au/icon/).

California (USA)

Recently, Australia has allowed importation of table grapes from California, USA, under the following conditions:

- Pre-clearance inspection by AQIS in the USA, including monitoring of the first three fumigations in certified chambers;
- Mandatory methyl bromide fumigation at rates from 40 g/m^3 for 2 hours at 26.5°C to 64 g/m^3 for 2 hours at 15.5°C, to be carried out pre-shipment;

- Inspection of 920 bunches per lot and suspension of exports on interception of live glassy-winged sharpshooters; and
- Review and evaluation of the program after one year of trade.

3.3.1 Domestic arrangements

The Commonwealth Government is responsible for regulating the movement of plants and their products into and out of Australia and the State and Territory governments are primarily responsible for plant health controls within Australia. Legislation relating to resource management or plant health may be used by State and Territory government agencies to control interstate movement of plants and their products.

To help facilitate interstate trade and ensure produce is pest free, the Interstate Certification Assurance (ICA) system was developed. The ICA scheme is a national scheme of Plant Health Certification that is accepted by all Australian States and the Northern Territory. ICA is based on documented operational procedures and provides a harmonised approach to the audit and accreditation of businesses throughout Australia, and the mutual recognition of Plant Health Assurance Certificates accompanying consignments of produce moving within Queensland or interstate. Interstate quarantine authorities maintain the right to inspect the certified produce at any time, and to refuse to accept a certificate where produce is found not to conform to specific requirements.

New South Wales

Under the *Plant Diseases Act 1924*, NSW Agriculture prohibits the introduction and movement within New South Wales of grape and related material and used vineyard machinery and equipment from Queensland and parts of Victoria on account of phylloxera (*Viteus vitifoliae*). A proclamation published in the Government Gazette 105 of 28 August 1992 noted that the previous clauses do not prohibit the introduction or movement of packaged fresh fruit, packaged dried fruit or fruit processed into juice or wine, which is free from all shoots, leaves, canes and other plant residue and soil.

South Australia

Condition 8 of the Plant Quarantine Standard of South Australia requires that table grapes from phylloxera-infested zones are prohibited entry into the State. Hosts of fruit flies (including grapes) can only be imported from areas free from fruit flies. Area-free status is determined by a system of male fruit fly lure traps deployed on a 400-m grid in urban areas and townships and a 1-km grid throughout the horticultural production areas. Traps are to be inspected weekly during the warmer months and fortnightly during winter in South Australia. Area freedom will be lost following the detection of flies or maggots as specified in the Codes of Practice for the Management of Queensland fruit fly and Mediterranean fruit fly. Under the *Fruit and Plant Protection Act 1992*, South Australia also prohibits importation of citrus red mite (*Panonychus citri*), European red mite (*Panonychus ulmi*), grape phylloxera (*Viteus vitifoliae*), and western flower thrips (*Frankliniella occidentalis*) and their hosts.

Western Australia

The *Plant Disease Act* of Western Australia prohibits the interstate movement of grape and related material into Western Australia because of the presence of downy mildew (*Plasmopara viticola*) in other States. European red mite (*Panonychus ulmi*), Queensland fruit fly (*Bactrocera tryoni*) and grape phylloxera (*Viteus vitifoliae*) are also listed as regulated pests for the State. Western Australia only allows importation of table grapes from areas free from downy mildew. Western Australia also prohibits the entry of any quarantine pests that are not recorded in the state by border inspection of all grape consignments.

3.4 The Table Grapes Industry

3.4.1 Production of table grapes in Australia

Table grapes are produced commercially in every State and Territory except Tasmania and the Australian Capital Territory (ACT). Approximately 80% of production occurs in Victoria and New South Wales (60% and 20% respectively) but the industry is expanding in parts of Queensland, South Australia and Western Australia. Production in the other States and the Northern Territory is reasonably static.

Data from the Australian Bureau of Statistics (ABS) show that table grape production has increased steadily from about 56,000 tonnes in 1996 to about 70,000 tonnes in 1999, with a slight seasonal drop in production for 2000 (Table 2). The domestic market absorbs between 60% and 80% of production each year, with Sydney and Melbourne the major markets. Quarantine restrictions on moving grapes across Australia, because of concerns of spreading fruit flies and downy mildew, have resulted in the Western Australian market and the central and eastern State markets operating independently.

Table 2: Australian table grape production by State/ Territory (tonnes)

State/Territory	1996	1997	1998	1999	2000
NSW	10,841	11,273	11,228	14,128	14,155
Vic	34,522	41,253	41,684	42,391	41,748
Qld	3,366	3,784	4,113	5,586	4,782
SA	3,769	2,551	4,063	2,149	2,049
WA	3,288	3,337	2,390	3,531	2,852
NT	N/A	1,099	1,494	N/A	N/A
Total	**55,786**	**63,297**	**64,972**	**67,785**	**65,586**

Source: ABS (2000) Australian wine and grape industry statistics 1329.0

ABS (2001) Australian wine and grape industry statistics 1329.0. Addendum

Table 3 shows the total area and production of grapes in Australia for the principal grape producing States. In 2000, the grape harvest was a record 1,311,382 tonnes. The grape harvest has increased in all States, with New South Wales recording the largest rise in production. South Australia remained the largest grape producing State, with a harvest of 483,314 tonnes, 37% of the total harvest. Nationally, the harvest of grapes for drying was 133,454 tonnes, 10% of total grape production. The harvest of table and other grapes was 66,791 tonnes, 5% of the total grapes produced.

Table 3: Area and production of grapes in Australia

State	Total area of vines (ha)	Grape production (2000)[a] (tonnes)			
		Wine making	Drying	Table and other	Total Production
NSW	32,269	287,954	19,137	14,128	321,219
Victoria	36,257	301,908	105,377	41,748	449,033
Queensland	2,171	1,919	8	4,782	6,709
South Australia	59,807	478,355	2,910	2,049	483,314
Western Australia	8,281	37,547	640	2,852	41,039
Tasmania	761	3,367	-	-	3,367
Total Australia [b]	139,861	1,111,137	133,454	66,791	1,311,382

(a) Fresh weight;

(b) Includes Australian Capital Territory and Northern Territory

Source: ABS (2000) Australian wine and grape industry statistics 1329.0

ABS (2001) Australian wine and grape industry statistics 1329.0. Addendum

3.4.2 Commercial varieties of table grapes produced in Australia

The main table grape varieties produced in Australia are Thompson Seedless (February to April), Flame Seedless (January to March), Menindee Seedless (January to March), Red Globe (February to June), Calmeria (April to June) and Red Emperor (April to August).

Newer varieties to Australia are Red Globe, a large seeded grape from Chile, and Sugarone, a green seedless grape. The Marroo, a black grape developed in Australia, was released in 1986 and several other varieties from America, Israel and South Africa are currently being evaluated for possible commercial production in Australia.

3.4.3 Exports of Australian table grapes

Total grape exports were about 2,000 tonnes at the beginning of the 1980s and rose to 33,485 tonnes in 1999–2000. The value of fresh grapes exported during the 1999–2000 season was $74.2 million. Markets that are, or have recently been, important as export markets include Singapore, Malaysia, Indonesia, Hong Kong, the United Kingdom and New Zealand (Table 4). Hong Kong and Singapore were the main markets for Australia fresh grapes, accounting for 36% and 21% respectively of total fresh grape exports in 1999–2000. The value of these exports was $40.9 million. The Australian table grape industry is interested in developing other markets.

Table 4: Australia's export markets of fresh grapes

Export Country	1998–19 99		1999–2000	
	Weight (tonnes)	Value (A$)	Weight (tonnes)	Value (A$)
Hong Kong	12,466	28,848,000	11,908	26,391,000
Indonesia	1,124	2,697,000	1,793	3,898,000
Malaysia	3,077	6,774,000	4,417	9,487,000
New Zealand	2,463	5,573,000	1,986	4,704,000
Singapore	5,577	13,210,000	6,929	14,530,000
Vietnam	821	2,240,000	848	2,170,000
Others	3,412	7,995,000	5,604	13,029,000
Total	**28,940**	**67,337,000**	**33,485**	**74,209,000**

Source: ABS (2000) Australian wine and grape industry statistics 1329.0

ABS (2001) Australian wine and grape industry statistics 1329.0. Addendum

3.4.4 Production of table grapes in Chile

Chile is the largest producer and exporter of table grapes in the southern hemisphere, and in the world is second largest only to Italy. In 1998, Chile supplied 860,000 tonnes of table grapes from 44,280 hectares of land (USDA, 2000). Grape production in Chile stretches from Region III to Region VII, with table grape growing principally concentrated in the central regions–Regions V, Region VI, and the Metropolitan Region (Table 5, Fig. 2). These three regions cover about 28,845 hectares, 65% of the total table grape production area.

In 1999, Region V supplied 198,160 tonnes of table grapes, followed by the Metropolitan Region with 195,861 tonnes and Region VI with 187,816 tonnes. These regions combined account for 68% of total table grape production (Table 5).

Table 5: Area and production of table grapes in Chile, 1999

	Production regions					
	III	IV	V	Metro	VI	Others
Area (ha)	6,460	8,460	10,500	9,230	9,115	515
Tonnes produced	108,770	160,297	198,160	195,861	187,816	4,634
%	12.7	18.7	23.2	22.9	22.0	0.54

Fig.2 Chilean table grape growing regions

Chile produces more than 35 varieties of table grapes for export. Most are seedless varieties such as Thompson Seedless and Flame Seedless. Thompson Seedless, the main export variety, accounts for more than half of the total Chilean table grape production and about 36.7% of all table grape exports. It is also called Sultanina and Sultana in Chile and Australia, respectively. Thompson Seedless, Flame Seedless and Ribier constitute about 90% of all table grapes exported by Chile. Because of growing popularity, the production of Red Globe and Ribier is expected to increase in the coming years.

Chilean table grapes are generally available from the third week of November to the last week of April. Total production, imports, domestic consumption and exports of table grapes in Chile for 1997-98 is given in Table 6. Production of the early season varieties such as Perlette, Sugraone, and Flame Seedless in November starts in the centre-north valleys of Copiapo (Region III) and ends in April in the centre-south valleys of Curico and Talca (Region VII), with varieties such as Red Globe, Ribier, Crimson Seedless, Red Seedless, and Emperor.

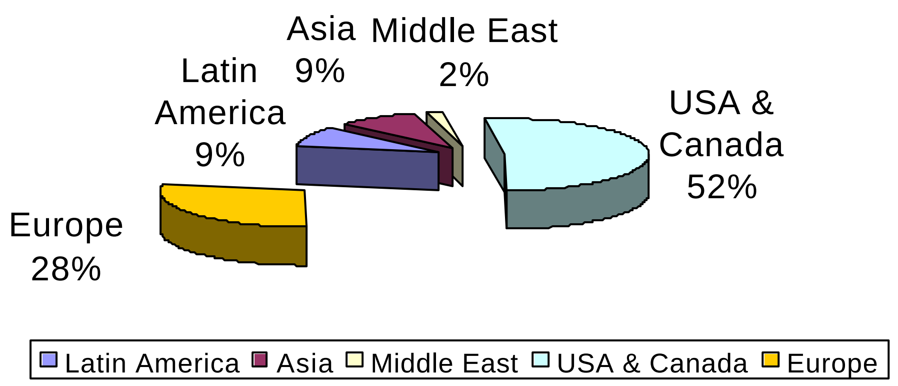
Table 6: Total production, imports, domestic consumption and exports of table grapes in Chile, 1997-1998 (tonnes)

Years	Total production	Imports	Domestic consumption	Exports
1997	815,000	170	365,170	450,000
1998	860,000	200	430,200	430,000

During the 1998/99 season 52% of Chilean table grape exports were shipped to the United States and Canada. The rest were distributed to Europe (28%), Latin America (9%), Asia (9%) and the Middle East (2%) (Fig.3).

Figure 3: Chile's export markets for table grapes during 1998/99 season

Source: Chilean Fresh Fruit Association, 1999



Chile received its first imports of table grapes from the United States in 1997, totalling 170 tonnes. The United States accounts for most of Chile's grape imports. The Chilean Ministry of Agriculture has allowed the entry of Californian table grapes provided they are accompanied by a phytosanitary certificate stating that the fruits are free from the Mediterranean fruit fly, mites, moths and other pests. Such risk procedures stem from the sanitary policy standards of the Marruceos Agreement adhered to by Chile. This gives Chile legal right to establish protectionist measures against viruses from imported fruits.

4. RESULTS OF PEST CATEGORISATION

4.1 Step 1: Presence or absence, regulatory status and association of pests with the pathway

The first stage of the pest categorisation for Chilean table grape clusters is presented in Appendices 1, 2 and 3. Appendix 1 contains the potential pests and weeds associated with Chilean table grape clusters based on their presence or absence in Australia (or present and under official control). Appendix 2 indicates whether the potential pest or weed occurs on the pathway under consideration in this IRA. Appendix 3 summarises the species that are to be considered in the second stage.

Table 7 provides, for each pest type (arthropods, gastropods, algae, bacteria, fungi, nematodes, phytoplasmas, viroids, viruses and weeds), a summary of the number known to be associated with table grape plants in Chile, the number present in Australia and the number associated with the import pathway (i.e. that occur on table grape clusters). Many of the pests and weeds associated with table grape plants in Chile occur in Australia or are not present on the import pathway. These pests and weeds do not need to be considered further in the IRA.

Table 7: Numerical summary of pests and weeds of table grapes in Chile, their occurrence in Australia and their association with table grape clusters

Pest type	Associated with table grapes in Chile	Australian status			Associated with fruit cluster	Consider further
		Present	Present and under official control	Not present		
Arthropods	79	32	3	45	21	21
Gastropods	1	1	0	0	0	0
Bacteria	3	3	0	0	0	0
Fungi	33	29	0	4	2	2
Nematodes	17	17	0	0	0	0
Phytoplasma	1	0	0	1	0	0
Viruses	6	4	0	2	1	1
Weeds	165	113	45	7	33	33
Total	**305**	**199**	**48**	**59**	**57**	**57**

4.1.1 Arthropods

Of the 79 arthropod pest species known on table grapes in Chile, 35 occur in Australia. Of the 35 species that occur in Australia, three species (*Panonychus ulmi*; *Ceratitis capitata*; and *Frankliniella occidentalis*) are under official control in some

States of Australia (Appendix 1). Of the three species under official control in Australia and the 45 species not present in Australia, 21 may be associated with table grape clusters and will be considered further in this IRA. These species include four species of Acari, one species of Araneae, one species of Coleoptera, one species of Diptera, three species of Hemiptera, one species of Hymenoptera, eight species of Lepidoptera and three species of Thysanoptera.

4.1.2 Gastropods

Helix aspersa is the only gastropod species known to occur on table grapes in Chile but because it is already present in Australia it will not be considered further in this IRA.

4.1.3 Pathogens

Of the 60 pathogens known on table grapes in Chile, 53 occur in Australia. Three bacterial pathogens recorded on table grapes in Chile are also present in Australia and will be excluded from further analysis.

Of the 33 fungal species known to occur on table grapes in Chile, 29 occur in Australia. Of the remaining four species that do not occur in Australia, two may be associated with grape fruit clusters and will be further assessed.

Seventeen nematode species are known on table grapes in Chile. All are known to occur in Australia and will not be considered further in the analysis.

Amarillamiento de Elqui is the only grapevine yellows disease known to occur in Chile (Elqui Valley in northern Chile). A phytoplasma is the suspected causal agent. Grapevine yellows disease has been reported in Australia (Padovan *et al.*, 1995). Australian grapevine yellows is associated with a unique phytoplasma that is more closely related to the phytoplasmas of the aster yellows group than to those of the elm yellows group (Padovan *et al.*, 1995). Recently, Davis *et al.* (1997) described Australian grapevine yellows phytoplasma as "*Candidatus phytoplasma australiense*". Grapevine yellows diseases pose a serious threat to vineyards in many wine regions of the world. Australia has introduced twice-yearly inspections of source vines for grapevine yellows phytoplasma strains. *Amarillamiento de Elqui* is not associated with the pathway and therefore will not be assessed further.

Of the seven viruses reported on table grapes in Chile, five occur in Australia. Of the remaining two, grapevine corky bark associated closterovirus is not in the pathway because it affects leaves and stems only. Peach rosette mosaic nepovirus (PRMV) is seed transmitted and could be in the pathway. PRMV is included for further assessment.

4.1.4 Weeds

Table grapes clusters for export to Australia may contain weed seeds of quarantine concern. Grape clusters may become contaminated by the seeds of plants growing in the rows or in close proximity to the vines. In all, 165 weed species are associated with table grapes in Chile. Of these, 52 are prohibited and/or noxious weeds in Australia and 33 are considered to have potential to be on the import pathway as contaminants. The 33 species are *Ambrosia artemisiifolia, Amsinckia caltcina, Avena barbata, Avena fatua, Avena sterilis, Avena strigosa, Bidens aurea, Cardaria draba, Carduus nutans, Carduus pycnocephalus, Carthamus lanatus, Cenchrus echinatus, Cenchrus incertus, Centaurea solstitialis, Conium maculatum, Digitaria ischaemum, Galium aparine, Hordeum jubatum, Hypericum perforatum, Ranunculus arvensis, Ranunculus muricatus, Ranunculus parviflorus, Ranunculus repens, Rumex conglomeratus, Rumex crispus, Rumex lonigfolius, Setaria verticillata, Silybum marianum, Sonchus arvensis, Sorghum halepense, Taeniatherum caput-medusae, Tribulus terrestris* and *Xanthium spinosum.* These weeds were assessed on the basis of possession of specific attributes, such as bristles, thorns or pappus, that would allow them to adhere to table grape bunches.

4.2 Summary of preliminary pest categorisation (stage 1)

To date, Biosecurity Australia has identified 21 arthropod pests, three pathogens (two fungi and one virus) and 33 weeds that are likely to be associated with Chilean table grapes imported into Australia (Appendix 3). These pests and weeds will be considered further in the IRA. The second step of pest categorisation will involve determining the potential of these pests to establish or spread in Australia and the economic consequences of their entry. The remaining part of risk assessment will consider risk management measures for these pests and weeds to achieve Australia's appropriate level of protection (ALOP). The final results of the pest categorisation and the complete risk assessment phase will be fully documented and released in the Draft IRA paper.

5. FURTHER STEPS IN THE IRA PROCESS

The administrative process adopted by AFFA requires that the following steps be undertaken for a routine IRA:

- release of the draft IRA paper for stakeholder comment
    - comment to be received within 60 days
- consideration of stakeholder comments on the draft IRA paper
    - further stakeholder consultation as necessary
- preparation of the final IRA paper
- submission of IRA recommendations to the Director of Animal and Plant Quarantine
- consideration of the recommendations by the Director of Animal and Plant Quarantine and final determination
- release of the final IRA paper
- consideration of appeals, if any
- if there are no appeals or the appeals are rejected, adoption of appropriate quarantine policy.

Stakeholders will be advised of any significant variation to the process.

Biosecurity Australia is committed to a thorough risk analysis of the proposed importation of table grapes from Chile. This analysis requires technical information be gathered from a wide range of sources. If you have information relevant to this IRA process for table grapes from Chile, please provide it as quickly as possible[3].

[3] Contact details for stakeholder contributions are provided in the accompanying Plant Biosecurity Policy Memorandum (PBPM).

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APPENDIX 1: PEST CATEGORISATION FOR CHILEAN TABLE GRAPES (OCCURRENCE IN AUSTRALIA)

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
ARTHRPODS						
Acari (mites)						
Brevipalpus chilensis Baker [Acari: Tenuipalpidae]	False red mite	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Brevipalpus obovatus Donnadieu [Acari: Tenuipalpidae]	Privet mite	Yes	Klein Koch & Waterhouse, 2000	Yes (except WA)	Halliday, 1998	No
Bryobia praetiosa Kock [Acari: Tetranychidae]	Almond mite	Yes	Halliday, 1998	Yes	Halliday, 1998	No
Bryobia rubrioculus (Sheuten) [Acari: Tetranychidae]	Brown almond mite	Yes	Halliday, 1998	Yes	Halliday, 1998	No
Calepitrimerus vitis (Nalepa) [Acari: Eriophyidae]	Grape rust mite	Yes	Gonzalez, 1983	Yes	Halliday, 1998	No
Colomerus vitis (Pagenstecher) [Acari: Eriophyidae] strain a	Grape erineum mite; grape leaf blister mite	Yes	Gonzalez, 1983	Yes	James & Whitney, 1993	No
Colomerus vitis (Pagenstecher) [Acari: Eriophyidae] strain b	Grape bud mite	Yes	Gonzalez, 1983	Yes	James & Whitney, 1993	No
Eotetranychus lewisi (McGregor) [Acari: Tetranychidae]	Lewis spider mite	Yes	Gonzalez, 1983	No		Yes
Oligonychus punicae (Hirst) [Acari: Tetranychidae]	Tetranychid mite	Yes	Gonzalez, 1983	Yes	Halliday, 2000	No
Oligonychus vitis Zaher & Shehata [Acari: Tetranychidae]	Table grape red mite	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Panonychus ulmi (Koch) [Acari: Tetranychidae]	European red mite	Yes	Gonzalez, 1983	Yes[1]	Bolland *et al*., 1998	Yes
Tetranychus desertorum Zacher [Acari: Tetranychidae]	Tetranychid mite	Yes	Prado, 1991	Yes	Halliday, 1998	No
Tetranychus ludeni Zacher [Acari: Tetranychidae]	Tetranychid mite	Yes	Prado, 1991	Yes	Halliday, 1998	No
Tetranychus urticae Koch [Acari: Tetranychidae]	Two-spotted mite	Yes	Klein Koch &	Yes	Halliday, 1998	No

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
			Waterhouse, 2000			
Coleoptera (beetles, weevils)						
Athlia rustica (Erichson) [Coleoptera: Scarabaeidae]	Brown beetle	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Callideriphus laetus Bl. [Coleoptera: Cerambycidae]	Peumo borer	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Dexicrates robustus (Blanchard) [Coleoptera: Bostrichidae]	Tree wood borer	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Geniocremnus chiliensis (Boheman) [Coleoptera: Curculionidae]	Tuberous pine weevil	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Micrapate humeralis (Blanchard) [Coleoptera: Bostrichidae]	Mesquite borer	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Micrapate scabrata (Erichson) [Coleoptera: Bostrichidae]	Vine borer	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Naupactus xanthographus (Germar) [Coleoptera: Curculionidae]	Fruit tree weevil	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Neoterius mystax (Blanchard) [Coleoptera: Bostrichidae]	Fence borer	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Otiorhynchus sulcatus (Fabricius) [Coleoptera: Curculionidae]	Vine weevil; black vine weevil	Yes	Prado, 1988	Yes	CSIRO, 2001	No
Pantomorus ruizi (Brèthes) [Coleoptera: Curculionidae]	Alfalfa root weevil	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Platyapistes glaucus Farhaeus [Coleoptera: Curculionidae]	Weevil	Yes	Prado, 1991	No		Yes
Platyapistes venustus (Erichson) [Coleoptera: Curculionidae]	Green weevil	Yes	Gonzalez, 1983	No		Yes
Diptera (flies)						
Ceratitis capitata (Wiedemann) [Diptera: Tephritidae]	Mediterranean fruit fly	Yes[2]	Prado, 1991	Yes[3]	Hancock *et al.*, 2000	Yes

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Drosophila melanogaster Meigen [Diptera: Drosophilidae]	Pomace fly	Yes	Godoy Herrera & Silva Cuadra, 1998	Yes	Olsen *et al*., 2001	No
Hemiptera (aphids, leafhoppers, mealybugs, scales, true bugs, whiteflies)						
Aphis fabae Scopoli [Hemiptera: Aphididae]	Black aphid	Yes	Rovirosa *et al*., 1992	No		Yes
Aphis gossypii Glover [Hemiptera: Aphididae]	Cotton aphid	Yes	Gonzalez, 1983	Yes	CSIRO, 2001	No
Aphis illinoisensis Shimer [Hemiptera: Aphididae]	Grapevine aphid	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Aphis spiraecola Patch [Hemiptera: Aphididae]	Spirea aphid; apple aphid	Yes	Klein Koch & Waterhouse, 2000	Yes	CSIRO, 2001	No
Aspidiotus nerii Bouché [Hemiptera: Diaspididae]	Ivy/oleander scale	Yes	Klein Koch & Waterhouse, 2000	Yes	CSIRO, 2001	No
Balclutha aridula (Linnaeus) [Hemiptera: Cicadellidae]	Ballica leafhopper	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Coccus hesperidum Linnaeus [Hemiptera: Coccidae]	Soft brown scale	Yes	Gonzalez, 1983	Yes	CSIRO, 2001	No
Diaspidiotus ancylus (Putnam) [Hemiptera: Diaspididae]	Putnam scale	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Hemiberlesia lataniae (Signoret) [Hemiptera:Diaspididae]	Lantania scale	Yes	Argyriou, 1990	Yes	CSIRO, 2001	No
Hemiberlesia rapax (Comstock) [Hemiptera: Diaspididae]	Greedy scale	Yes	Klein Koch & Waterhouse, 2000	Yes	CSIRO, 2001	No
Icerya palmeri Riley-How [Hemiptera: Margarodidae]	Margarodes scale	Yes	Prado, 1991	No		Yes
Leptoglossus chilensis (Spinola) [Hemiptera: Coreidae]	Brown Chilean leaf-footed bug	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Margarodes vitis (Philippi) [Hemiptera: Margarodidae]	Grape pearl	Yes	Klein Koch & Waterhouse, 2000	No		Yes

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Nezara viridula (Linnaeus) [Hemiptera: Pentatomidae]	Green vegetable bug	Yes	Klein Koch & Waterhouse, 2000	Yes	CSIRO, 2001	No
Parthenolecanium corni (Bouché) [Hemiptera: Coccidae]	European fruit Lecanium	Yes	Klein Koch & Waterhouse, 2000	Yes (except WA)	CSIRO, 2001	No
Parthenolecanium persicae (Fabricius) [Hemiptera: Coccidae]	European peach scale	Yes	Klein Koch & Waterhouse, 2000	Yes	CSIRO, 2001	No
Pseudococcus calceolariae (Maskell) [Hemiptera: Pseudococcidae]	Citriphilus mealybug	Yes	Prado, 1991	Yes (except WA)	CSIRO, 2001	No
Pseudococcus longispinus (Targioni-Tozzetti) [Hemiptera: Pseudococcidae]	Longtailed mealybug	Yes	Klein Koch & Waterhouse, 2000	Yes	CSIRO, 2001	No
Pseudococcus maritimus (Ehrhorn) [Hemiptera: Pseudococcidae]	Grape mealybug	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Pseudococcus viburni (Signoret) Hemiptera: Pseudococcidae]	Root mealybug	Yes	Klein Koch & Waterhouse, 2000	Yes (except WA)	Gullan, 2000	No
Quadraspidiotus perniciosus (Comstock) Rahman & Ansari, [Hemiptera: Diaspididae]	San José scale	Yes	Klein Koch & Waterhouse, 2000	Yes (except Tasmania)	CSIRO, 2001	No
Saissetia oleae (Olivier) [Hemiptera: Coccidae]	Black scale	Yes	Klein Koch & Waterhouse, 2000	Yes	CSIRO, 2001	No
Tettigades chilensis Amyot & Serville [Hemiptera: Cicadidae]	Common cicada	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Hymenoptera (ants, wasps)						
Polistes buyssoni Brethes [Hymenoptera: Vespidae]	Paper wasp	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Vespula germanica (Fabricius) [Hymenoptera: Vespidae]	European wasp	Yes	Klein Koch & Waterhouse, 2000	Yes (except WA)	CSIRO, 2001	No
Isoptera (termites)						
Neotermes chilensis (Blanchard) [Isoptera: Kalotermitidae]	Chilean termite	Yes	Klein Koch & Waterhouse, 2000	No		Yes

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Lepidoptera (moths, butterflies)						
Accuminulia buscki J. Brown [Lepidoptera: Euliini]	Tortricid leafroller	Yes	Brown, 1999	No		Yes
Accuminulia longiphallus J. Brown [Lepidoptera: Euliini]	Tortricid leafroller	Yes	Brown, 1999	No		Yes
Agrotis ipsilon (Hufnagel) [Lepidoptera: Noctuidae]	Black cutworm	Yes	Parra *et al*., 1986	Yes	CSIRO, 2001	No
Chileulia stalactitis (Meyrick) [Lepidoptera: Tortricidae]	Grape berry moth	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Copitarsia consueta (Walker) [Lepidoptera: Noctuidae]	Copitarsia cutworm	Yes	Lamborot *et al*., 1999	No		Yes
Copitarsia turbata (Herrich-Schaffer) [Lepidoptera: Noctuidae]	Copitarsia cutworm	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Hyles annei (Guérin-Méneville) [Lepidoptera: Sphingidae]	Vine hornworm	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Hyles euphorbiarum (Guérin-Méneville & Pereron) [Lepidoptera: Sphingidae]	Palqui hornworm	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Hyles lineata Fabricius [Lepidoptera: Sphingidae]	White lined sphinx	Yes	Gonzalez, 1983	Yes	CSIRO, 2001	No
Paracles rudis (Butler) [Lepidoptera: Arctiidae]	Red grape caterpillar	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Peridroma saucia (Hübner) [Lepidoptera: Noctuidae]	Variegated cutworm	Yes	Angulo *et al*., 1990	No		Yes
Proeulia apospata Obraztsov [Lepidoptera: Euliini]	Wine leaf roller	Yes	Gonzales, 1983	No		Yes
Proeulia auraria (Clarke) [Lepidoptera: Euliini]	Orange leaf roller	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Proeulia chrysopteris (Butler) [Lepidoptera: Euliini]	Fruit leaf roller	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Proeulia triquetra Obraztsov [Lepidoptera: Euliini]	Grape leaf roller	Yes	Klein Koch & Waterhouse, 2000	No		Yes

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Orthoptera (crickets, grasshoppers, katydids)						
Achaeta fulvipennis Brown [Orthoptera: Gryllidae]	Cricket	Yes	Gonzalez, 1983	No		Yes
Dichroplus maculipennis (Blanchard) [Orthoptera: Acrididae]	Spotted wing grasshopper	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Schistocerca cancellata (Serville) [Orthoptera: Acrididae]	South American locust	Yes	Gonzalez, 1983	No		Yes
Thysanoptera (thrips)						
Drepanothrips reuteri Uzel [Thysanoptera: Thripidae]	Grape thrips	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Frankliniella australis Morgan [Thysanoptera: Thripidae]	Chilean flower thrips	Yes	Klein Koch & Waterhouse, 2000	No		Yes
Frankliniella occidentalis (Pergande) [Thysanoptera: Thripidae]	Western flower thrips	Yes	Klein Koch & Waterhouse, 2000	Yes[4]	Mound & Gillespie, 1997	Yes
Heliothrips haemorrhoidalis (Bouche) [Thysanoptera: Thripidae]	Greenhouse thrips	Yes	Klein Koch & Waterhouse, 2000	Yes	CSIRO, 2001	No
Thrips australis (Bagnall) [Thysanoptera: Thripidae]	Eucalyptus thrips	Yes	Prado, 1991	Yes	CSIRO, 2001	No
Thrips tabaci Lindemann [Thysanoptera: Thripidae]	Onion thrips	Yes	Klein Koch & Waterhouse, 2000	Yes	CSIRO, 2001	No
GASTROPODA (snails, slugs)						
Helix aspersa (Müller)	Brown garden snail, common garden snail	Yes	Rebolledo *et al*., 1992	Yes	Furness, 1977	No
HITCH-HIKERS						
Latrodectus mactans (Frabricius) [Araneae: Theridiidae]	Black widow spider	Yes	Schenone & Correa, 1985	No		Yes
BACTERIA						
Agrobacterium vitis (Smith & Townsend) Conn	Crown gall of grapes	Yes	Burr *et al*., 1998	Yes	Gillings &	No

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
					Ophel-Keller, 1995	
Pseudomonas syringae pv. *syringae* van Hall	Bacterial canker	Yes	Bradbury, 1986	Yes	Bradbury, 1986	No
Rhizobium radiobacter (Beijerinck & van Delden) Pribram	Crown gall	Yes	Bradbury, 1986	Yes	Bradbury, 1986	No
FUNGI						
Alternaria spp.	Raisin moulds, bunch rots	Yes	AQIS, 2000	Yes	AQIS, 2000	No
Alternaria alternata (Fr.) Keissl.	Alternaria leaf s pot	Yes	Mujica *et al*., 1980	Yes	APDD, 2002	No
Alternaria vitis Cavara	Alternaria leaf spot	Yes	Moreno, 1999	No		Yes
Armillaria mellea (Vahl.: Fr.) Kumm	Armillaria root rot	Yes	SAG, 1995	No		Yes
Aspergillus niger van Tiegh.	Black-mould rot	Yes	SAG, 1995	Yes	APDD, 2002	No
Botrytis cinerea Pers.: Fr.	Botrytis rot	Yes	SAG, 1995	Yes	APDD, 2002	No
Cladosporium herbarum (Pers.: Fr.) Link	Cladosporium rot	Yes	Mujica *et al*., 1980	Yes	APDD, 2002	No
Elsinoe ampelina (de Bary) Shears	Anthracnose, bird's eye rot (black spot)	Yes	Mujica *et al*., 1980	Yes	APDD, 2002	No
Epicoccum nigrum Link	Cereal leaf spot	Yes	Mujica *et al*., 1980	Yes	APDD, 2002	No
Fusarium moniliforme Sheldon	Fruit rot; root rot	Yes	CMI, 1990	Yes	APDD, 2002	No
Fusarium oxysporum Schlechtendahl: Fr.	Fusarium wilt	Yes	CMI, 1970	Yes	APDD, 2002	No
Fusarium culmorum (W.G. Sm.) Sacc.	Damping off	Yes	CMI, 1968	Yes	APDD, 2002	No
Glomerella cingulata (Stonem.) Spauld. & Sch.)	Ripe rot	Yes	Peredo & Valenzuela, 1988	Yes	APDD, 2002	No
Guignardia bidwellii (Ellis) Viala & Ravaz	Black rot	Yes	Mujica *et al*., 1980	No		Yes
Mucor racemosus Fres.	Spongy storage rot	Yes	Mujica *et al*., 1980	Yes	APDD, 2002	No
Nectria cinnabarina (Tode) Fr.	Twig blight	Yes	Mujica *et al*., 1980	Yes	APDD, 2002	No
Penicillium spp.	Soft rot of grapes	Yes	Moreno, 1999	Yes	APDD, 2002	No
Phoma vitis Bonord	Fruit rot	Yes	Shivas, 1989	Yes	Shivas, 1989	No

Pest	**Common name**	**Occurrence in Chile**	**Reference**	**Occurrence in Australia**	**Reference**	**Consider pest further? (yes/no)**
Phomopsis viticola (Sacc.) Sacc.	Phomopsis cane and leaf spot, black rot	Yes	Mujica & Oehrens, 1967	Yes	Merrin *et al*., 1995	No
Phytophthora cactorum (Lebert & Cohn) Schröter	Crown and root rot	Yes	Latorre *et al*., 2001	Yes	Wicks *et al*., 1984	No
Phytophthora cinnamomi Rands	Crown and root rot	Yes	Latorre *et al*., 1997	Yes	Marks *et al*., 1975	No
Phytophthora cryptogea Pethybr. & Laff.	Crown and root rot	Yes	Latorre *et al*., 1997	Yes	APDD, 2002	No
Phytophthora drechsleri Tucker	Fruit rot	Yes	Latorre *et al*., 1997	Yes	APDD, 2002	No
Plasmopara viticola (Berkeley & Curtis) Berl. & de Toni	Downy mildew	Yes	Macenauer, 1993	Yes	Emmet *et al*., 1992	No
Pleospora herbarum (Fr.) Rabenh.	Bunch rot	Yes	Mujica & Oehrens, 1967	Yes	APDD, 2002	No
Pleospora vitis Catt	Bunch rot	Yes	Mujica *et al*., 1980	No		Yes
Pythium debaryanum Hesse	Damping off	Yes	Mujica & Oehrens, 1967	Yes	Marks & Kassaby, 1974	No
Rosellinia necatrix Prill	Rosellinia root rot	Yes	Pearson & Goheen, 1994	Yes	Pearson & Goheen, 1994	No
Talaromycetes wortmannii (Klocker) C.R. Benjamin	Blue mould rot	Yes	Soto *et al*., 1973	Yes	Nicholas *et al*., 1994	No
Trichothecium roseum (Pers.) Link.	Pink mould rot	Yes	Soto *et al*., 1973	Yes	APDD, 2002	No
Ulocladium atrum Preuss	Ulocladium blight	Yes	Soto *et al*., 1973	Yes	APDD, 2002	No
Uncinula necator (Schwein.) Burrill	Grapevine powdery mildew	Yes	Latorre *et al*., 1996	Yes	APDD, 2002	No
Verticillium dahliae Kleb.	Verticillium wilt	Yes	Latorre *et al*., 1989	Yes	APDD, 2002	No
NEMATODES						
Ditylenchus spp.	Stem nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Helicotylenchus dihystera (Cobb) Sher.	Spiral nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Hemicycliophora spp.	Sheath nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Longidorus spp.	Needle nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Macroposthonia xenoplax (Raski) de Grisse & Loof	Ring nematode	Yes	Allen *et al*., 1971	Yes	Nicholas & Stewart, 1984	No
Meloidogyne arenaria (Neal) Chitwood	Root knot nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Meloidogyne incognita Chitwood	Root knot nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Meloidogyne javanica (Treub) Chitwood	Root knot nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Paratylenchus nanus Cobb	Pin nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Paratylenchus vandenbrandei de Grisse	Pin nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Pratylenchus neglectus (Rensch) Filipjev & S. Stekhoven	Root-lesion nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Pratylenchus thornei Sher & Allen	Root-lesion nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Tylenchorhynchus spp.	Stunt nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Tylenchulus semipenetrans Cobb	Citrus root nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Xiphinema americanum Cobb	Dagger nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Xiphinema index Thorne & Allen	Dagger nematode	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No
Zygotylenchus sp.	No common name	Yes	Allen *et al*., 1971	Yes	McLeod *et al*., 1994	No

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
PHYTOPLASMAS						
Amarillamiento de Elqui	Grapevine yellows phytoplasma	Yes	Pearson & Goheen, 1994	No		Yes
VIRUSES						
Grapevine fanleaf *nepovirus*	Grapevine court-noué virus	Yes	SAG, 1999	Yes	Krake & Woodham, 1983	No
Grapevine leafroll associated *closterovirus*	Grapevine Leafroll disease	Yes	SAG, 1999	Yes	Habili *et al*., 1996	No
Grapevine corky bark associated *closterovirus*	Stem pitting of grapevine	Yes	Sharky pers. com., 1999	No		Yes
Peach rosette mosaic *nepovirus*	Berry shelling disease	Yes	Moreno pers. com., 1999	No		Yes
Tobacco ringspot *nepovirus*	Annulus tabaci	Yes	Moreno pers. com., 1999	Yes	CABI/EPPO, 1998a	No
Tomato ring spot *nepovirus*	Grapevine yellow vein	Yes	CABI/EPPO, 1998b	Yes	CABI/EPPO, 1998b	No
WEEDS						
Achillea millefolium L.	Yarrow; milfoil	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Agrostis stolonifera L.	Blown grass	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Aira caryophyllea L.	Silery hairgrass	Yes	Espinoza, 2000	Yes	AQIS, 2001	No
Allium vineale L.	Crow garlic	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Amaranthus albus L.	Tumbleweed	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Amaranthus deflexus L.	Spreading amaranthus	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Amaranthus retroflexus L.	Redroot amaranth	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Amaranthus viridis L.	Green amaranth	Yes	Matthei, 1995	Yes	Holm *et al*., 1991	No

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Ambrosia artemisiifolia L.	Annual ragweed	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Amsinckia calycina (Moris) Chater	Yellow burrweed	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Anagallis arvensis L.	Scarlet pimpernel	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Apium nodiflorum Reichb.		Yes	Matthei, 1995	Yes	AQIS, 2001	No
Arctotheca calendula (L.) Levyns	Capeweed	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Artemisia absinthium L.	Wormwood	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Avena barbata Pott. Ex Link	Bearded oat	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Avena fatua L.	Wild oat	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Avena sterilis L.	Sterile oat	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Avena strigosa Schreb.	Sand oat	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Bidens aurea (Ait.) Sherff	Arizona beggarticks	Yes	Espinoza, 2000	No[6]		Yes
Bidens pilosa L.	Cobbler's pegs	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Brassica napus L.	Winter rape	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Brassica rapa L.	Turnip	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Bromus catharticus Vahl.	Prairie grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Bromus diandrus Roth.	Great brome	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Bromus hordeaceus L.	Soft brome	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Bromus lanceolatus Roth.	Mediterranean brome	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Bromus madritensis L.	Madrid brome	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Bromus racemosus L	Brome grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Bromus secalinus L.	Brome grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Bromus sterilis L.	Brome grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Bromus tectorum L.	Drooping brome	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Calandrinia compressa DC.	Parakeelya	Yes	Matthei, 1995	Yes	AQIS, 2001	No
Calendula arvensis L.	Field marigold	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Calystegia sepium (L.) R. Br.	Greater bineweed	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Capsella bursa-pastoris (L.) Medic.	Shepherd's purse	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Cardamine hirsuta L.	Common bittercress	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Cardaria draba (L.) Desv.	Hoary cress	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Carduus nutans L.	Nodding thistle	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Carduus pycnocephalus L.	Slender thistle	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Carthamus lanatus L.	Saffron thistle	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Cenchrus echinatus L.	Mossman river grass	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Cenchrus incertus Curt.	Spiny burrgrass	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Centaurea solstitialis L.	Pineapple weed	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Chamomilla suaveolens (Pursh) Rydb.	Chamomile	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Chenopodium album L.	Fat hen	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Chenopodium ambrosioides L.	Wormseed	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Chenopodium ficifolium Sm.	Figleaf goosefoot	Yes	Matthei, 1995	No[6]		Yes
Chenopodium murale L.	Nettle-leaved goosefoot	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Chloris gayana Kunth.	Rhode grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Chloris virgata Sw.	Feathertop Rhode grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Chrysanthemoides moniliferum (L.) Norlindh	Boneseed	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Chrysanthemum segetum L.	Corn daisy	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Conium maculatum L.	Hemlock	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Convolvulus arvensis L.	Field bineweed	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Conyza bonariensis (L.) Cronq.	Flaxleaf fleabane	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Cuscuta suaveolens Ser.	Fringed dodder	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Cynodon dactylon (LC Rich) Pers.	Couch	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Cynosurus echinatus L.	Rough dogstail	Yes	Demanet & Romero, 1987	Yes	Hnatiuk, 1990	No
Cyperus rotundus L.	Nutgrass	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Dactylis glomerata L.	Cocksfoot	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Datura stramonium L.	Common thornapple	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Digitaria ischaemum (Schreb.) Schreb.	Smooth summer grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Digitaria sanguinalis (L.) Scop.	Crabgrass	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Diplotaxis muralis (L.) Dc.	Wall rocket	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Echinochloa crusgalli (L.) Beauv.	Barnyard grass	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Echium plantagineum L.	Paterson's curse	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Echium vulgare L.	Viper's bugloss	Yes	Espinoza, 2000	Yes[5]	Hnatiuk, 1990	Yes
Equisetum bogotense Kunth	Horsetail	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Eragrostis virescens Presl.	Mexican lovegrass	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Eremocarpus setigerus (Hook) Benth.	Doveweed	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Erodium botrys (Cav.) Bertol.	Long storksbill	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Erodium cicutarium (L.) L'Herit. ex W. Ait.	Common storksbill	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Erodium moschatum (L.) L'Herit. ex W. Ait.	Musky storksbill	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Eruca vesicaria Cav.	Roquette	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Euphorbia cyathophora Murr.	Painted spurge	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Euphorbia falcata L.	Sickleleaf spurge	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Euphorbia helioscopia L.	Sun spurge	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Euphorbia hirta var. *hirta* L.	Spurge	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Euphorbia lathyrus L.	Caper spurge	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Euphorbia maculata L.	Eyebane	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Euphorbia peplus L.	Petty spurge	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Euphorbia platyphyllos L.		Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Festuca arundinacea Schreb.	Tall fescue	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Galega officinalis L.	Goat's rue	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Galinsoga parviflora Cav.	Potato weed	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Galium aparine L.	Cleavers	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Geranium dissectum L.	Cutleaf cranesbill	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Geranium molle L.	Dove's foot cranesbill	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Geranium robertianum L.	Herb Robert	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Glechoma hederacea L.	Ground ivy	Yes	Matthei, 1995	Yes	AGWEST, 2001	No
Holcus lanatus L.	Yorkshire fog	Yes	Matthei, 1995	Yes	AQIS, 2001	No
Hordeum jubatum L.	Foxtail barley	Yes	Matthei, 1995	No[2]		Yes
Hordeum marinum Huds.	Sea barley grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Hordeum murinum L.	Wild barley	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Hordeum secalinum Schreb.	Meadow barley	Yes	Matthei, 1995	Yes	Lazarides *et al*., 1997	No
Hypericum perforatum L.	St John's wort	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Hypochaeris glabra L.	Smooth cat's ear	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Juncus procerus E. Mey.	Rush	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Kickxia elatine (L.) Dum.	Twining toadflax	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Lactuca serriola L.	Prickly lettuce	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Lamium amplexicaule L.	Deadnettle	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Lolium multiflorum Lam.	Italian ryegrass	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Lolium perenne L.	Perennial ryegrass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Lolium temulentum L.	Bearded rye grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Lotus uliginosus L. Schk.	Large bird's foot trefoil	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Malva neglecta Wallr.	Dwarf mallow	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Malva nicaensis All.	Mallow of Nice	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Modiola caroliniana (L.) G. Don.	Red-flowered mallow	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Oxalis corniculata L.	Yellow wood sorrel	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Oxalis pes-caprae L.	Soursob	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Panicum capillare L.	Witchgrass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Panicum miliaceum L.	Millet panic	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Paspalum dilatatum Poir.	Paspalum	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Paspalum paspalodes Scribn.	Buffalo quick paspalum	Yes	Matthei, 1995	Yes	AQIS, 2001	No
Pastinaca sativa L.	Parsnip	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Pennisetum clandestinum Hochst. Ex Chiov.	Kikuyu grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Physalis pubescens L.		Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Picris echioides L.		Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Plantago lanceolata L.	Ribwort	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Poa annua L.	Annual poa	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Poa pratensis L.	Kentucky bluegrass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Polygonum aviculare L.	Knotweed	Yes	Espinoza, 2000	No[6]		Yes
Polygonum hydropiper L.		Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Polygonum lapathifolium L.		Yes	Matthei, 1995	No[6]		Yes
Polygonum persicaria L.	Red shank	Yes	Espinoza, 2000	No[6]		Yes
Portulaca oleracea L.		Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Prunella vulgaris L.	Self-heal	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Ranunculus arvensis L.	Corn buttercup	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Ranunculus muricatus L.	Sharp fruited buttercup	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Ranunculus parviflorus L.	Small-flowered buttercup	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Ranunculus repens L.	Creeping buttercup	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Raphanus raphanistrum L.	Wild radish	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Raphanus sativus L.	Radish	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Rapistrum rugosum (L.) All.	Turnip weed	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Rubia tinctorum L.	Medic	Yes	Matthei, 1995	Yes	AQIS, 2001	No
Rubus ulmifolius Schott	Blackberry	Yes	Espinoza, 2000	Yes[5]	Hnatiuk, 1990	Yes

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Rumex acetosella L.	Dock	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Rumex conglomeratus Murr.	Clustered dock	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Rumex crispus L.	Curled dock	Yes	Espinoza, 2000	Yes[6]	Hnatiuk, 1990	Yes
Rumex longifolius DC.	Long leaved dock	Yes	Matthei, 1995	No[6]		Yes
Salsola kali L.	Prickly saltwort	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Senecio mikanioides Otto	Cape ivy, German ivy	Yes	Matthei, 1995	Yes	Lazarides *et al*., 1997	No
Senecio sylvaticus L.	Wood groundsel, mountain groundsel	Yes	Matthei, 1995	Yes	AQIS, 2001	No
Setaria pumila (Poir.) Roem. & Schult.	Queensland pigeon grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Setaria verticillata (L.) Beauv.	Whorled pigeon grass	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Setaria viridis (L.) Beauv.	Green pigeon grass	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Silene gallica L.	French catchfly	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Silybum marianum (L.) Gaertn.	Variegated thistle	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Solanum nigrum L.	Black nightshade	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Sonchus arvensis L.	Corn sowthistle	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Sonchus asper (L.) Hill	Rough sowthistle	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Sonchus tenerrimus L.	Clammy sowthistle	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Sorghum halepense (L.) Pers.	Johnson grass	Yes	Espinoza, 2000	Yes[5]	Hnatiuk, 1990	Yes
Spergula arvensis L.	Corn spurry	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Stellaria media (L.) Cyr.	Chickweed	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Taeniatherum caput-medusae Boiss	Medusa-head	Yes	Matthei, 1995	Yes[6]	Hnatiuk, 1990	Yes
Taraxacum officinale Wiggers ex Wiggers	Dandelion	Yes	Espinoza, 2000	Yes	AQIS, 2001	No
Tribulus terrestris L.	Caltrop	Yes	Matthei, 1995	Yes[5]	Hnatiuk, 1990	Yes
Urtica dioica var. *mollis* L.	Stinging nettle	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Urtica urens L.	Dwarf nettle	Yes	Espinoza, 2000	Yes	George, 1989	No
Veronica anagallis L.		Yes	Espinoza, 2000	Yes	Anon., 1999	No

Pest	Common name	Occurrence in Chile	Reference	Occurrence in Australia	Reference	Consider pest further? (yes/no)
Veronica arvensis L.	Wall speedwell	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Veronica persica Poir.	Creeping speedwell	Yes	Matthei, 1995	Yes	Hnatiuk, 1990	No
Vicia sativa L.	Common vetch	Yes	Espinoza, 2000	Yes	Hnatiuk, 1990	No
Xanthium spinosum L.	Bathurst burr	Yes	Espinoza, 2000	Yes[5]	Hnatiuk, 1990	Yes

1 Regulated pest in SA, WA.

2 Under official control in Australia.

3 Under official control in Chile.

4 Under official control in NT, SA, Vic, Tas.

5 Under official control under state and/or federal regulations.

6 Prohibited by proclamation or in the quarantine plant regulations, under the Quarantine Act.

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APPENDIX 2: PEST CATEGORISATION FOR CHILEAN TABLE GRAPES (PATHWAY ASSOCIATION)

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
ARTHROPODS					
Acari (mites)					
Brevipalpus chilensis Baker [Acari: Tenuipalpidae]	False red mite	Yes	Eggs are laid on the lower parts of the leaves and along the shoots. Feed mainly on green leaves and fruits, injuring the epidermis and causing blotching, stippling or bronzing.	Gonzalez, 1983	Yes
Eotetranychus lewisi (McGregor) [Acari: Tetranychidae]	Lewis spider mite	Yes	Primarily feeds on foliage and lays eggs on undersides of leaves. Feeding damage is often observed on the upper leaf surface as a characteristic mottled or speckled appearance.	Williamson, 2001	Yes
Oligonychus vitis Zaher & Shehata [Acari: Tetranychidae]	Table grape red mite	Yes	Primarily feeds on foliage and lays eggs on the base of buds or in scars in wood. Larvae head for leaves, placing themselves on both leaf surfaces, as well as being present on shoots. The main damage to the plant consists of browning of the leaf laminae and a slight web production that favours dust deposition. The attack of the foliage can lead to early defoliation in certain varieties.	Gonzalez, 1983	Yes
Panonychus ulmi (Koch) [Acari: Tetranychidae]	European red mite	Yes	Adults and nymphs primarily feed on leaves and causes pale spotting. Mites overwinter as eggs on the bud scales. Nymphs appear very early in the growing season and pierce leaf cells to extract plant juices. Heavy mite infestations early in the year have the most effect on yields in the same season because they can the sugar content of grapes.	Kast, 1992; Weigle *et al*., 2000	Yes

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
Coleoptera (beetles, weevils)					
Athlia rustica (Erichson) [Coleoptera: Scarabaeidae]	Brown beetle	No	Primarily feeds on leaves and buds.	Gonzalez, 1983	No
Callideriphus laetus Bl. [Coleoptera: Cerambycidae]	Peumo borer	No	Primarily feeds on downed logs, stumps, dead or dying branches. It has been recorded as using grape vines as a host.	Klein Koch & Waterhouse, 2000	No
Dexicrates robustus (Blanchard) [Coleoptera: Bostrichidae]	Wood borer	No	An accidental pest of grape vines associated with trunks and roots.	Gonzalez, 1983	No
Geniocremnus chiliensis (Boheman) [Coleoptera: Curculionidae]	Tuberous pine weevil	Unknown	This recently described polyphagous species can be a pest of localised importance in Chilean vineyards.	Gonzalez, 1983	Yes
Micrapate humeralis (Blanchard) [Coleoptera: Bostrichidae]	Mesquite borer	No	Although grape vines are considered to be a host and other species of the genus have been recorded in grape consignments, it is restricted to dry plant material containing starches and sugars such as dead and dry sapwood.	Prado, 1991	No
Micrapate scabrata (Erichson) [Coleoptera: Bostrichidae]	Vine borer	No	Adults bore holes into the bases of the buds and vine trunks where eggs are laid. The larvae penetrate into the wood and construct a gallery in which they live and feed. This species mainly affects buds, branches, shoots and stems. Overwinters as larvae, pupae and adult.	Gonzalez, 1983	No
Naupactus xanthographus (Germar) [Coleoptera: Bostrichidae]	Fruit tree weevil	No	In Chile, it is considered one of the more important pests of deciduous fruit trees and vines. The adults emerge from the soil over a period of 5-6 months between spring and early autumn. Most abundant in November and February and live for about eight months. A generation is completed in 19-20 months. Larvae feeds on roots and main	Caballero, 1972; Gonzalez, 1983; Ripa, 1986	No

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
			root will stop growing and will decay. Eggs are laid in late summer and autumn. Larvae feed on the rootlets of the plants or tunnel in older roots; when infestation is heavy, the plants are killed. The adults feed on the leaves, but cause less damage than the larvae.		
Neoterius mystax (Blanchard) [Coleoptera: Bostrichidae]	Fence borer	No	An opportunistic pest of vines.	Salinas, 1975	No
Pantomorus ruizi (Brèthes) [Coleoptera: Curculionidae]	Alfalfa root weevil	No	This species is only reported from Argentine and Chile. Potatoes are the main host of this weevil. It mainly feeds on foliage	Morrone & Lanteri, 1991	No
Platyapistes glaucus Farhaeus [Coleoptera: Curculionidae]	Weevil	No	Not associated with grapes.	Prado, 1991	No
Platyapistes venustus (Erichson) [Coleoptera: Curculionidae]	Green weevil	No	Not associated with grapes.	Prado, 1991	No
Diptera (flies)					
Ceratitis capitata (Wiedemann) [Diptera: Tephritidae]	Mediterranean fruit fly	Yes	Highly polyphagous species that causes damage to a wide range of unrelated fruit primarily through oviposition into the fruit where larvae feed internally.	Hancock *et al*., 2000; Gould 1995	Yes
Hemiptera (aphids, leafhoppers, mealybugs, scales, true bugs)					
Aphis fabae Scopoli [Hemiptera: Aphididae]	Black bean aphid	Yes	Feeding damage is of greater economic significance than virus transmission. It is, however, a relatively poor vector of plant viruses, compared with other economically important aphids.	Cammell & Way, 1983; Blackman & Eastop, 2000	Yes
Aphis illinoisensis Shimer [Hemiptera: Aphididae]	Grapevine aphid	Yes	Damages new foliage and flower clusters and can attack maturing leaves and fruits. When populations are high some may feed on fruit clusters, causing some berries to drop.	Pfeiffer & Schultz, 1986	Yes

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
Balclutha aridula (Linnaeus) [Hemiptera: Cicadellidae]	Ballica leafhopper	No	Leafhoppers feed on leaves and as injury increases, photosynthetic activity decreases. Heavily damaged leaves lose their green color, dry up and may fall off the vine. Feeding can also delay berry sugar accumulation and leafhopper production of honeydew can result in spotting of fruit. Leafhoppers overwinter as adults, and are found on newly emerged grape leaves. Both adults and nymphs feed on leaves by puncturing leaf cells and sucking other nutrients.	Gonzalez, 1983; USDA, 2002	No
Diaspidiotus ancylus (Putnam) [Hemiptera: Diaspididae]	Putnam scale	No	Heavy infestations can kill twigs and branches.	Arancibia *et al*., 1990	No
Icerya palmeri Riley-How [Hemiptera: Margarodidae]	Margarodes scale	No	Lives on a wide variety of hosts, especially woody plants. Damage to the plant is caused by sap depletion; shoots dry up and die, and defoliation occurs. As with most sap-sucking insects, the production of honeydew leads to the growth of sooty mould.	Morales, 1991	No
Leptoglossus chilensis (Spin.) [Hemiptera: Coreidae]	Brown Chilean leaf-footed bug	No	Primarily feeds on grapevine shoots. Little information is available on the biology of this pest, other species of this genus preferably feed on leaves and occasionally on fruits. Has been recorded as causing fruit damage on citrus. The pest punctures the fruit and sucks juice, which often results in fruit drop as well as providing access for various fungal diseases and insects.	Fasulo & Stansly, 1999	No
Margarodes vitis (Philippi) [Hemiptera: Margarodidae]	Grape ground pearl	No	Feeds on fluids sucked from roots. Oviposition takes place from November to early February and the larvae appear in January and February. As soon as the larvae find a suitable rootlet, it introduces its mouthpart into the phloem tissue	Gonzalez, 1983; Gonzalez *et al*., 1969	No

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
			and start forming the cysts. The first moult occurs in October and the next year, in November, the second moult takes place.		
Pseudococcus maritimus (Ehrhorn) [Hemiptera: Pseudococcidae]	Grape mealybug	Yes	Feeding and injury is primarily on leaves and developing buds. Adults and larvae cause damage by sucking sap and excreting honeydew onto fruit and leaves, leading to sooty mould growth that interferes with photosynthesis. It feeds on the rachis, the pedicular and on the seed it self.	Grimes & Cone, 1985; Gonzalez, 1983	Yes
Tettigades chilensis Amyot & Serville [Hemiptera: Cicadidae]	Common cicada	No	Primarily feeds on roots, stems and trunks.	Miller *et al*., 2001	No
Hymenoptera (ants, wasps)					
Polistes buyssoni Brethes [Hymenoptera: Vespidae]	Paper wasp	Yes	Wasps may break open skins of the grape berries in order to reach the sweet contents. In the early part of the growing seasons these wasps are mainly predatory.	Araya *et al*., 1997; Tuckey, 2002	Yes
Isoptera (termites)					
Neotermes chilensis (Blanchard) [Isoptera: Kalotermitidae]	Chilean termite	No	Mainly attacks woody tissue and like, most termites, lives cryptically.	Prado, 1991	No
Lepidoptera (moths, butterflies)					
Accuminulia buscki Brown [Lepidoptera: Euliini]	Tortricid leafroller	Yes	Feeds on table grape fruits.	Brown, 1999	Yes
Accuminulia longiphallus Brown [Lepidoptera: Euliini]	Tortricid leafroller	Yes	Feeds on table grape fruits.	Brown, 1999	Yes
Chileulia stalactitis (Meyrick) [Lepidoptera: Tortricidae]	Grape berry moth	Yes	Adult moths lay eggs among the grape clusters. Larvae feed internally in grape berries. Larvae cut flaps in grape leaves and pupate inside, emerging as adult moth. Causes damage by direct feeding on clusters during bloom period. After berries have developed, larvae enter berries and feed within.	Weigle *et al*., 2000; Gonzalez, 1983	Yes

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
			Late season feeding results in damage to multiple berries per cluster as berry enlargement cause berries to touch each other facilitating movement of single larvae from berry to berry within a cluster.		
Copitarsia consueta (Walker) [Lepidoptera: Noctuidae]	Cutworm	No	Sporadic pest of grapes. Larvae feed on the buds from full bud swell through bud break. Larvae hide during the day under the bark and in the soil litter beneath a vine and come out at night to feed.	Weigle *et al*., 2000	No
Copitarsia turbata (Herrich-Schaffer) [Lepidoptera: Noctuidae]	Copitarsia cutworm	No	Sporadic pest of grapes. Larvae feed on the buds from full bud swell through bud break. Larvae hide during the day under the bark and in the soil litter beneath a vine and come out at night to feed.	Weigle *et al*., 2000	No
Hyles annei (Guérin-Méneville) [Lepidoptera: Sphingidae]	Vine hornworm	No	An opportunistic leaf feeder.	Prado, 1991	No
Hyles euphorbiae (Linnaeus) [Lepidoptera: Sphingidae]	Leafy spurge hawk moth	No	Primarily feeds on soft stems and foliage.	Prado, 1991	No
Paracles rudis (Butler) [Lepidoptera: Arctiidae]	Red grape caterpillar	No	Larvae are typically stem and leaf feeders and are considered to be one of the most serious pests of ornamental plants, because they can consume all plant tips and act as a severe defoliator.	Prado, 1991	No
Peridroma saucia (Hübner) [Lepidoptera: Noctuidae]	Variegated cutworm	No	Primarily feeds on leaves, stems, growing points, and inflorescence of agricultural crops and low growing fruit trees. Eggs are usually laid on suitable host plants, preferentially on twigs and stems rather than on leaves. On hatching the larvae eat the eggshell before turning to plant material. The larvae are primarily climbing cutworms, usually leaving the feeding areas to spend the day on the ground or on plant stems; they are mostly inactive during the day. In some situations the larvae will behave like surface cutworms and will stay on the ground and cut off	Molinari *et al*., 1995	No

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
			the plant at the base and move on to the next plant.		
Proeulia apospata Obraztsov [Lepidoptera: Euliini]	Fruit tree leaf roller	Yes	Feeds on leaves, flowers and is capable of boring into the fruit. It affects both leaves and fruit, with wine grapes receiving intense attacks in the bunch, although no more than one larva has been recorded per bunch.	Gonzalez, 1983; Brown, 1999	Yes
Proeulia auraria (Clarke) [Lepidoptera: Euliini]	Chilean fruit tree leaf folder	Yes	This species affects buds, fruit, and other growing points on leaves and shoots as a result of larval feeding. The insect also hibernates as a first larval stage under grapevine bark and in protected spots next to the buds or in wood angles and destroys the growing points. The larvae have been recorded as webbing leaves to fruit to provide shelter.	Gonzalez, 1983; Brown, 1999	Yes
Proeulia chrysopteris (Butler) [Lepidoptera: Euliini]	Fruit leaf folder	Yes	Feeds on leaves, flowers and is capable of boring into the fruit.	Brown & Passoa, 1998; Brown, 1999	Yes
Proeulia triquetra Obraztsov [Lepidoptera: Euliini]	Grape leaf roller, fruit tree leaf roller	Yes	Feeds on leaves, flowers and is capable of boring into the fruit. It affects both leaves and fruit, with wine grapes receiving intense attacks in the bunch, although no more than one larva has been recorded per bunch.	Gonzalez, 1983; Brown, 1999	Yes
Orthoptera (crickets, grasshoppers, katydids)					
Achaeta fulvipennis Brown [Orthoptera: Gryllidae]	Cricket	No	Feeds on foliage of several hosts and is found principally in ground cover.	Zanin, 1995	No
Dichroplus maculipennis (Blanchard) [Orthoptera: Acrididae]	Spotted wing grasshopper	No	Feeds on grasses growing in vineyards.	Cigliano & Torrusio, 1999	No
Schistocerca cancellata (Serville) [Orthoptera: Acrididae]	South American locust	No	An opportunistic foliage feeder including grapes.	Gonzalez, 1983	No

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
Thysanoptera (thrips)					
Drepanothrips reuteri Uzel [Thysanoptera: Thripidae]	Grape thrips	Yes	Primarily feeds on leaf primordia, young shoots and buds. Overwinters as mature females under debris on the vineyard floor. In the spring they lay their eggs in flower, leaf and stem tissue. Can scar berries as a result of fruit feeding, which renders certain white varieties used for table grapes unmarketable. Extensive berry scarring can also leads to severe loss of pigment in red varieties. Thrips feeding on shoots can severely stunt leaf and shoot growth in the spring and summer.	UC, 2000; WSU, 2002; Gonzalez, 1983	Yes
Frankliniella australis Morgan [Thysanoptera: Thripidae]	Chilean flower thrips	Yes	Feeds around the sepals and calyces of young blossoms and causes the development of scar tissue that can result in misshapen fruit and reduced returns. Can also affect leaves and shoots. Found on grape vines mainly during the time of inflorescence. The rest of the time it inhabits any plant, which allows the development of nymphs and adults.	Gonzalez, 1983; Lewis, 1997	Yes
Frankliniella occidentalis (Pergande) [Thysanoptera: Thripidae]	Western flower thrips	Yes	Eggs are laid concealed in parenchyma cells of leaves, flowers and fruits of host species. As it feeds, it produces scar tissue, which extends and widens as the fruit grows, and the damaged skin turns scurvy and fruits become misshapen.	Lewis, 1973	Yes
HITCH-HIKERS					
Latrodectus mactans (Fabricius) [Araneae: Theridiidae]	Black widow spider	Yes (hitch hiker)	Although this species feeds on fauna rather than on table grapes directly, it has been recorded as having been imported into Ireland, and more recently into New Zealand, with table grape shipments from California.	Ross, 1988	Yes

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
FUNGI					
Alternaria vitis Cavara [Hyphomycetes]	Alternaria leaf spot	No	Infects leaves and produces lesions on leaves Causes leaf spots and defoliation.	Suhag *et al*., 1983	No
Armillaria mellea (Vahl.: Fr.) Kumm [Agaricales: Tricholomataceae]	Armillaria root rot, honey root rot	No	A root pathogen.	Elkins *et al*., 1998	No
Guignardia bidwellii (Ellis) Viala & Ravaz [Dothiodeales: Mycosphaerellaceae]	Black rot	Yes	The fungus overwinters in mummies (dried, shrivelled grapes) left on ground or vines. Rain releases and splashes the spores from the mummies onto the leaves, forming lesions that release spores, which infect leaves and fruit all season.	Ries, 1996	Yes
Pleospora vitis Catt [Dothideales: Pleosporaceae]	Bunch rot	Yes	There is little specific information for this species, although several *Pleospora* species described on various hosts are likely to have similar effects.	Smith *et al*., 1988	Yes
PHYTOPLASMAS					
Amarillamiento de Elqui	Grapevine yellows phytoplasma	No	Grapevine yellows disease shows the symptoms of *flavesence doree*. The leaves harden, roll slightly abaxially and tend to overlap. The brittle leaves first become golden yellow or red (depending on cultivars) on all parts most exposed to sun. Later in summer, creamy spots appear along the main veins. These cream-colored spots generally become necrotic. Sometimes, angular spots occur, which are yellow in white-fruited cultivars and red in black-fruited cultivars.	Pearson & Goheen, 1994	No
VIRUSES					
Grapevine corky bark associated *closterovirus*	Corky bark of grapevine	No	Causes pits and grooves in trunk and is transmitted by vector. Transmitted by grafting.	Brunt *et al*., 1996	No

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
			Transmission by contact between plants, seed or pollen has not been reported.		
Peach rosette mosaic *nepovirus* (PRMV)	Grapevine degradation, berry shelling disease	Yes	PRMV is graft transmissible and vectored by *Xiphinema americanum* and *Longidorus diadectus*. The disease occurs in more or less circular patches in orchards and vineyards, where it spreads slowly, mostly to vines adjacent to infected plants. Seeds and contact between plants transmit PRMV.	Allen & Ebsary, 1988; Stobbs & van Schagen, 1996; Pearson & Goheen, 1994	Yes
WEEDS					
Allium vineale L.	Crow garlic	No	Black seed 3 to 4 mm long, flattened on one side. The main means of spread is through soil borne bulbils rather than windblown seed.	Parsons & Cuthbertson, 1992	No
Ambrosia artemisiifolia L.	Annual ragweed	Yes	Spreads over long distances because beaked and spined seeds are adapted to dispersal by sheep, furred animals, woolpacks, bags and clothing, and by water.	Parsons & Cuthbertson, 1992	Yes
Amsinckia calycina (Moris) Chater	Yellow burrweed	Yes	The main cause of dispersal has been through movement of contaminated farm equipment and through contaminated seed, fodder and stock.	Parsons & Cuthbertson, 1992	Yes
Avena barbata Pott. Ex Link	Bearded oat	Yes	An annual grass that reproduces by seed, which adheres to animals, trousers etc. The principal means of dispersal has been as a contaminant of grains.	Holm *et al*., 1997	Yes
Avena fatua L.	Wild oat	Yes	As above	Holm *et al*., 1997	Yes
Avena sterilis L.	Sterile oat	Yes	As above	Holm *et al*., 1997	Yes
Avena strigosa Schreb.	Sand oat	Yes	As above	Holm *et al*., 1997	Yes
Bidens aurea (Ait.) Sherff	Arizona beggarticks	Yes	Narrow fruits with barbed awns result in attachment to clothing and animals and wide	Hussey *et al*., 1997	Yes

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
			dispersal.		
Cardaria draba (L.) Desv.	Hoary cress	Yes	Seeds possess sticky coating that, when moist, allows the seed to adhere to objects and animals. Potentially a strong competitor in disturbed sites.	Holm *et al*., 1997	Yes
Carduus nutans L.	Nodding thistle	Yes	A prolific seed producer. The pappus of the seed has fine-toothed bristles which may assist with in adhering to clothing, wool, bags and fir.	Holm *et al*., 1997	Yes
Carduus pycnocephalus L.	Slender thistle	Yes	Dispersed by wind, water, man and machines. Dispersal is assisted by the presence of a pappus.	Holm *et al*., 1997	Yes
Carthamus lanatus L.	Saffron thistle	Yes	Dispersal is only by seed. Although a pappus is present, this aids little in wind dispersal. It does, however, assist in adhering to clothing, wool, bags, and fur.	Parsons & Cuthbertson, 1992	Yes
Cenchrus echinatus L.	Mossman river grass	Yes	Dispersal by spiny burrs, which adhere to any fibrous material.	Parsons & Cuthbertson, 1992	Yes
Cenchrus incertus Curt.	Spiny burrgrass	Yes	Restricted distribution; confined to open sandy situations. Does not establish readily in pastures where it is often out competed by commercial species, lucerne in particular.	Parsons & Cuthbertson, 1992	Yes
Centaurea solstitialis L.	Pineapple weed, raygrass	Yes	Seeds without pappus have low dispersal potential though those with pappus may be dispersed by wind, or by adhering to machinery, wool or fur.	Parsons & Cuthbertson, 1992	Yes
Chenopodium ficifolium Sm.	Figleaf goosefoot	No	Seeds are borne in utricles in axillary panicles and have no special adaptations for wind dispersal, although dispersal by animals eating fruits has been reported for other species in the genus.	Holm *et al*., 1997	No
Chenopodium murale L.	Nettle-leaved goosefoot	No	Seeds are borne in utricles in axillary panicles and have no special adaptations for wind dispersal, although dispersal by animals eating fruits has	Holm *et al*., 1997	No

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
			been reported for other species in the genus.		
Chrysanthemoides moniliferum (L.) Norlindh	Boneseed	No	Spread is by bird dispersal of fruit. Rabbits, foxes and cattle may also eat the fruit. Fruit and seeds can also be carried by water.	Parsons & Cuthbertson, 1992	No
Conium maculatum L.	Hemlock	Yes	Dispersal is by seeds, which adhere to farm equipment, vehicles, agricultural produce, mud and clothing. There is also a limited capacity for wind dispersal.	Parsons & Cuthbertson, 1992	Yes
Convolvulus arvensis L.	Field bineweed	No	Spread by seed and roots, with seeds contaminating fodder, machinery, and grain for sowing, particularly wheat. Migratory birds have also been implicated in long-distance dispersal.	Parsons & Cuthbertson, 1992	No
Cuscuta suaveolens Ser.	Fringed dodder	No	Dispersal mainly as a contaminant of Lucerne and clover seed. Seeds have also been recorded as spreading in mud on the feet of birds.	Parsons & Cuthbertson, 1992	No
Datura stramonium L.	Common thornapple	No	Commonly distributed as a contaminant of soybeans, in soil and in agricultural seed stock.	Holm *et al*., 1997	No
Digitaria ischaemum (Schreb.) Schreb.	Smooth summer grass	Yes	A vigorously growing grass species that is a common pasture weed. Potential for short-distance wind dispersal.	Wheeler *et al*., 1984	Yes
Echium plantagineum L.	Paterson's curse	No	A prolific seed producer. Spread by animals, although the most important means of dispersal has been as a contaminant of hay or grain.	Parsons & Cuthbertson, 1992	No
Echium vulgare L.	Viper's bugloss	No	Mainly a weed of pastures.	Parsons & Cuthbertson, 1992	No
Equisetum bogotense Kunth	Horsetail	No	May disperse by water-borne microscopic spores although most commonly spread is by vegetative means.	Parsons & Cuthbertson, 1992	No
Eragrostis virescens Presl.	Mexican lovegrass	No	Species of this genus are generally spread by short-distance wind dispersal, as seed	Parsons & Cuthbertson, 1992	No

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
			contaminants or in mud adhering to animals and machinery.		
Eremocarpus setigerus (Hook) Benth.	Doveweed	No	Spread is through mud sticking to animals, farm machinery and other products and as an impurity in farm produce.	Parsons & Cuthbertson, 1992	No
Galium aparine L.	Cleavers	Yes	A prolific seed producer. Dispersal is by wind, water and animals and humans due to the possession of bristles in seeds and fruit that assist in adhering to fur and fibres.	Lazarides *et al.,* 1997	Yes
Hordeum jubatum L.	Foxtail barley, squirrel tail	Yes	The sharp seeds of this species may assist in adhering to table grape bunches.	Lazarides *et al.*, 1997	Yes
Hypericum perforatum L.	St John's wort	Yes	A prolific seed producer. Dispersal is by water, mud, soil, and agricultural produce, particularly hay and chaff.	Parsons & Cuthbertson, 1992	Yes
Juncus procerus E. Mey.	Rush	No	Mainly confined to moist areas rather than in vineyards. Dispersal is most commonly by water. Can contaminate all types of agricultural produce, machinery, vehicles, water, and mud.	Parsons & Cuthbertson, 1992	No
Oxalis corniculata L.	Yellow wood sorrel	No	Primarily spread by the movement of contaminated soil with soil-borne bulbils and introduction as an ornamental.	Parsons & Cuthbertson, 1992	No
Oxalis pes-caprae L.	Soursob	No	Primarily spread by the movement of contaminated soil with soil-borne bulbils and introduction as an ornamental.	Parsons & Cuthbertson, 1992	No
Polygonum aviculare L.	Knotweed	No	Primarily dispersed by birds feeding on fruits.	Holm *et al*., 1997	No
Polygonum lapathifolium L.		No	Seed is most commonly dispersed as crop seed contaminants but also has been recorded as being dispersed by rabbits.	Holm *et al*., 1997	No
Polygonum persicaria L.	Red shank	No	A prolific seed producer. Most commonly spread as crop seed contaminants, in water and by	Holm *et al*., 1997	No

Pest	**Common name**	**Associated with table grape cluster (yes/no)**	**Comment**	**Reference**	**Consider pest further? (yes/no)**
			animals.		
Ranunculus arvensis L.	Corn buttercup	Yes	A common weed found in vineyards. The fruit is a bristled achene that allows for dispersal by attachment to animals.	CABI, 2000	Yes
Ranunculus muricatus L.	Sharp fruited buttercup	Yes	A common weed of gardens, lawns, wetlands and grounds/pastures. Seeds have spines that assist in dispersal by animals.	Lamp & Collet, 1989	Yes
Ranunculus parviflorus L.	Small-flowered buttercup	Yes	A common weed of gardens, lawns, wetlands grounds/pastures. Seeds have spines that assist in dispersal by animals.	Lamp & Collet, 1989	Yes
Ranunculus repens L.	Creeping buttercup	Yes	Dispersed by birds which may result in contamination of grape bunches.	Holm *et al*., 1997	Yes
Raphanus raphanistrum L.	Wild radish	No	A prolific seed producer and a common to serious problem in small grains, especially wheat.	Parsons & Cuthbertson, 1992	No
Rubus ulmifolius Schott	Blackberry	No	Primarily dispersed by birds feeding on fruits.	Parsons & Cuthbertson, 1992	No
Rumex conglomeratus Murr.	Clustered dock	Yes	A prolific seed producer and a serious competitor for nutrients and space in pastures. The fruit is well equipped for wind dispersal as a result of large wing-like valves on the persistent perianth and as such may contaminate uncovered bunches.	Bodkin, 1993	Yes
Rumex crispus L.	Curled dock	Yes	A prolific seed producer and weed of permanent pastures, irrigation ditches and many cultivated crops. The fruit is well equipped for wind dispersal as a result of large wing-like valves on the persistent perianth and as such may contaminate uncovered bunches.	Bodkin, 1993	Yes
Rumex longifolius DC.	Long leaved dock	Yes	A prolific seed producer and weed of permanent pastures, irrigation ditches and many cultivated	Bodkin, 1993	Yes

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
			crops. The fruit is well equipped for wind dispersal as a result of large wing-like valves on the persistent perianth and as such may contaminate uncovered bunches.		
Salsola kali L.	Prickly saltwort	No	Dispersed readily through tumbling habit. Main cause of spread internationally and nationally as a contaminant in wheat and grains, as well as in straw and hay.	Holm *et al*., 1997	No
Setaria verticillata (L.) Beauv.	Whorled pigeon grass	Yes	Weed of maize, sorghum, sugarcane, and wheat crops. Dispersal is assisted by complete inflorescences being carried on clothing or animal fur assisted by barbed bristles on the spikelets and as such may contaminate table grape bunches.	Wheeler *et al*., 1984	Yes
Silybum marianum (L.) Gaertn.	Variegated thistle	Yes	Spread by natural means, by transport vehicles, animals and on articles of commerce such as sacks etc.	Holm *et al*., 1997	Yes
Sonchus arvensis L.	Corn sowthistle	Yes	A prolific seed producer. Dispersal is mainly by water, and due to the pappus, potentially by wind for short distances and as such may contaminate table grape bunches.	Holm *et al*., 1997	Yes
Sorghum halepense (L.) Pers.	Johnson grass	Yes	Seed is 3-4 mm long with detached spikelets being wind dispersed or by sticking to wool and fur. Seed may also be spread as a contaminant in agricultural produce and in mud sticking to vehicles.	Parsons & Cuthbertson, 1992	Yes
Taeniatherum caput-medusae Boiss	Medusa-head	Yes	Prolific seed producer and annual grasses in which one species in particular has become a major environmental weed of grasslands and agricultural weed of pasture in the USA. Seed disperses by wind, soil movement, human	CDFA, 2001	Yes

Pest	Common name	Associated with table grape cluster (yes/no)	Comment	Reference	Consider pest further? (yes/no)
			activities and by adhering to animals. Seed possess barbs that can be injurious to stock and that may result in contamination of table grape bunches.		
Tribulus terrestris L.	Caltrop	Yes	A woody burr with sharp rigid spines. The fruit readily attaches to animals, vehicle tyres and almost any object placed upon it. When growing in orchards, vineyards and market gardens, can contaminate the harvested product	Parsons & Cuthbertson, 1992	Yes
Xanthium spinosum L.	Bathurst burr	Yes	The fruit is a burr with numerous hooked spines. Well adapted to dispersal by animals and by man through attachment to virtually any fibrous material.	Parsons & Cuthbertson, 1992	Yes

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APPENDIX 3: PESTS AND WEEDS THAT WILL REQUIRE FURTHER EVALUATION IN THE IRA

Pest	Common name	Consider pest further?
ARTHROPODS		
Acari (mites)		
Brevipalpus chilensis Baker [Acari: Tenuipalpidae]	False red mite	Yes
Eotetranychus lewisi (McGregor) [Acari: Tetranychidae]	Lewis spider mite	Yes
Oligonychus vitis Zaher & Shehata [Acari: Tetranychidae]	Table grape red mite	Yes
Panonychus ulmi (Koch) [Acari: Tetranychidae]	European red mite	Yes
Geniocremnus chiliensis (Boheman) [Coleoptera: Curculionidae]	Tuberous pine weevil	Yes
Ceratitis capitata (Wiedemann) [Diptera: Tephritidae]	Mediterranean fruit fly	Yes
Hemiptera (aphids, leafhoppers, mealybugs, scales, true bugs)		
Aphis fabae Scopoli [Hemiptera: Aphididae]	Black bean aphid	Yes
Aphis illinoisensis Shimer [Hemiptera: Aphididae]	Grapevine aphid	Yes
Pseudococcus maritimus (Ehrhorn) [Hemiptera: Pseudococcidae]	Grape mealybug	Yes
Hymenoptera (ants, wasps)		
Polistes buyssoni Brethes [Hymenoptera: Vespidae]	Paper wasp	Yes
Lepidoptera (moths, butterflies)		
Accuminulia buscki Brown [Lepidoptera: Euliini]	Tortricid leafroller	Yes
Accuminulia longiphallus Brown [Lepidoptera: Euliini]	Tortricid leafroller	Yes
Chileulia stalactitis (Meyrick) [Lepidoptera: Tortricidae]	Grape berry moth	Yes
Proeulia apospata Obraztsov [Lepidoptera: Euliini]	Fruit tree leaf roller	Yes
Proeulia auraria (Clarke) [Lepidoptera: Euliini]	Chilean fruit tree leaf folder	Yes
Proeulia chrysopteris (Butler) [Lepidoptera: Euliini]	Fruit leaf folder	Yes
Proeulia triquetra Obraztsov [Lepidoptera: Euliini]	Grape leaf roller, fruit tree leaf roller	Yes
Thysanoptera (thrips)		
Drepanothrips reuteri Uzel [Thysanoptera: Thripidae]	Grape thrips	Yes
Frankliniella australis Morgan [Thysanoptera: Thripidae]	Chilean flower thrips	Yes
Frankliniella occidentalis (Pergande) [Thysanoptera: Thripidae]	Western flower thrips	Yes
HITCH-HIKERS		
Latrodectus mactans (Fabricius) [Araneae: Theridiidae]	Black widow spider	Yes
FUNGI		
Guignardia bidwellii (Ellis) Viala & Ravaz [Dothiodeales: Mycosphaerellaceae]	Black rot	Yes
Pleospora vitis Catt [Dothideales: Pleosporaceae]	Bunch rot	Yes
VIRUSES		
Peach rosette mosaic *nepovirus* (PRMV)	Grapevine degradation, berry shelling disease	Yes
WEEDS		
Ambrosia artemisiifolia L.	Annual ragweed	Yes
Amsinckia calycina (Moris) Chater	Yellow burrweed	Yes
Avena barbata Pott. Ex Link	Bearded oat	Yes
Avena fatua L.	Wild oat	Yes
Avena sterilis L.	Sterile oat	Yes

Pest	Common name	Consider pest further?
Avena strigosa Schreb.	Sand oat	Yes
Bidens aurea (Ait.) Sherff	Arizona beggarticks	Yes
Cardaria draba (L.) Desv.	Hoary cress	Yes
Carduus nutans L.	Nodding thistle	Yes
Carduus pycnocephalus L.	Slender thistle	Yes
Carthamus lanatus L.	Saffron thistle	Yes
Cenchrus echinatus L.	Mossman river grass	Yes
Cenchrus incertus Curt.	Spiny burrgrass	Yes
Centaurea solstitialis L.	Pineapple weed	Yes
Conium maculatum L.	Hemlock	Yes
Digitaria ischaemum (Schreb.) Schreb.	Smooth summer grass	Yes
Galium aparine L.	Cleavers	Yes
Hordeum jubatum L.	Foxtail barley	Yes
Hypericum perforatum L.	St John's wort	Yes
Ranunculus arvensis L.	Corn buttercup	Yes
Ranunculus muricatus L.	Sharp fruited buttercup	Yes
Ranunculus parviflorus L.	Small-flowered buttercup	Yes
Ranunculus repens L.	Creeping buttercup	Yes
Rumex conglomeratus Murr.	Clustered dock	Yes
Rumex crispus L.	Curled dock	Yes
Rumex longifolius DC.	Long leaved dock	Yes
Setaria verticillata (L.) Beauv.	Whorled pigeon grass	Yes
Silybum marianum (L.) Gaertn.	Variegated thistle	Yes
Sonchus arvensis L.	Corn sowthistle	Yes
Sorghum halepense (L.) Pers.	Johnson grass	Yes
Taeniatherum caput-medusae Boiss	Medusa-head	Yes
Tribulus terrestris L.	Caltrop	Yes
Xanthium spinosum L.	Bathurst burr	Yes