

Industry Biosecurity Plan for the Onion Industry

Version 2.0 October 2012



Plant Health
AUSTRALIA



onions
australia



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Tasmania
Explore the possibilities



Queensland
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Northern
Territory
Government

Endorsement

The *Industry Biosecurity Plan for the Onion Industry (Version 2.0)* was formally endorsed by the onion industry (through Onions Australia) in September 2012, and the Australian Government and all state and territory governments (through the Plant Health Committee) in September 2012.

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List of acronyms

ACPPO	Australian Chief Plant Protection Office
APVMA	Australian Pesticides and Veterinary Medicines Authority
AQIS	Australian Quarantine and Inspection Service
AS/NZS	Australian Standard/New Zealand Standard
BOLT	Biosecurity On-Line Training
DAFF	Department of Agriculture, Fisheries and Forestry
DAFF Qld	Department of Agriculture, Fisheries and Forestry, Queensland
DAFWA	Department of Agriculture and Food, Western Australia
DPI NSW	Department of Primary Industries, New South Wales
DPI Vic	Department of Primary Industries, Victoria
DPIF	Department of Primary Industry and Fisheries, Northern Territory
DPIPWE	Department of Primary Industries, Parks, Water and Environment, Tasmania
DQMAWG	Domestic Quarantine and Market Access Working Group
EPP	Emergency Plant Pest
EPPRD	Emergency Plant Pest Response Deed
FAO	Food and Agriculture Organization of the United Nations
HACCP	Hazard Analysis Critical Control Point
HPP	High Priority Pest
IBG	Industry Biosecurity Group
IBMP	Industry Best Management Practice
IBP	Industry Biosecurity Plan
ICON	Import Conditions Database
ILO	Industry Liaison Officer
IPM	Integrated Pest Management
IPPC	International Plant Protection Convention
IRA	Import Risk Analysis
ISPM	International Standards for Phytosanitary Measures
MICoR	Manual of Importing Country Requirements
NAQS	Northern Australian Quarantine Strategy
NGIA	Nursery and Garden Industry Australia
NIASA	Nursery Industry Accreditation Scheme
NPSRT	National Plant Surveillance Reporting Tool
NT	Northern Territory

PaDIL	Pest and Disease Image Library
PHA	Plant Health Australia
PIRSA	Primary Industries and Regions South Australia
QA	Quality Assurance
QRAA	Queensland Rural Adjustment Authority
R&D	Research and Development
SA	South Australia
SARDI	South Australian Research and Development Institute
SPC	Secretariat of the Pacific Community
SPHDS	Subcommittee on Plant Health Diagnostic Standards
SPS	Sanitary and Phytosanitary
SQF	Safe Quality Food
TST	Threat Summary Table
WA	Western Australia
WQA	Woolworths Quality Assurance
WTO	World Trade Organisation

INTRODUCTION

Introduction

Plant Health Australia

Plant Health Australia (PHA) is a public company, with members including the Australian Government, all state and territory governments, and a range of plant industry organisations. The company was formed to address high priority plant health issues, and to work with all its members to develop an internationally outstanding plant health management system that enhances Australia's plant health status and the sustainability and profitability of plant industries.

Onions Australia

Onions Australia is the peak industry body for the Australian onion industry, representing approximately 248 onion growers nationally. Onion production is centred in South Australia and Tasmania, although all states produce significant volumes. Onions Australia supports research and development (R&D) projects with the objective to improve efficiency, product quality and sustainability. Research is undertaken to identify best practice maintenance or eradication methods for pests and diseases within the onion industry. Development is concerned with proof of concept, safety testing, and determining ideal levels and delivery mechanisms. R&D also includes projects involved in advancing communications between growers, the general public and government bodies.

Need for biosecurity plans

Australia's geographic isolation and lack of shared land borders have, in the past, provided a degree of natural protection from exotic threats. Australia's national quarantine system also helps to prevent the introduction of harmful exotic threats to plant industry. Rapid increases in overseas tourism, imports and exports, mail and changing transport procedures (e.g. refrigeration and containerisation of produce), as well as the potential for pests to enter via natural routes, mean that there will always be some risk of an exotic pest entering Australia.

Biosecurity planning provides a mechanism for the onion industry, government and other relevant stakeholders to actively determine pests of highest priority, analyse the risks they pose and put in place practices and procedures that would rapidly detect an incursion, minimise the impact if a pest incursion occurs and reduce the chance of pests becoming established.

Ensuring the onion industry has the capacity to minimise the risks posed by pests, and to respond effectively to any pest threats is a vital step for the future sustainability and viability of the industry. Through this pre-emptive planning process, the industry will be better placed to maintain domestic and international trade, and reduce the social and economic costs of pest incursions on both growers and the wider community. The information gathered during these processes provides additional assurance that the Australian onion industry is free from specific pests, which assists the negotiation of access to new overseas markets.

The definition of a **pest** used in this document covers all insects, mites, snails, nematodes, pathogens (diseases) and weeds that are injurious to plants, plant products or bees.

Exotic pests are those not currently present in Australia. **Endemic pests** are those that are established within Australia.

Pest threats are those that have or are being identified as significant to the industry. The most important threats are defined as **key** or **high priority threats**.

Under arrangements of the EPPRD, emergency plant pests (EPPs) are defined as those that meet one or more of the following criteria:

- a) It is a **known exotic plant pest**, the economic consequences of an incident of which would be **economically or otherwise harmful** for Australia, and for which it is considered to be in the regional or national interest to be free of the plant pest
- b) It is a **variant form of an established plant pest** which can be distinguished by appropriate investigative and diagnostic methods, and which if established in Australia, would have a regional or national impact
- c) It is a **serious plant pest of unknown or uncertain origin** which may, on the evidence available at the time, be an entirely new plant pest, and which if established in Australia would have an adverse economic impact regionally and or nationally
- d) It is a **plant pest of potential economic importance** to the area endangered thereby and **not yet present** there or widely distributed and being officially controlled, but is occurring in such a fulminant incursion form, that an emergency response is required to ensure that there is not either a large scale epidemic of regional or national significance or serious loss of market access.

The Emergency Plant Pest Response Deed

The Emergency Plant Pest Response Deed (EPPRD) has been negotiated between the government and industry members of PHA to cover the management and funding arrangements of eradication responses to EPP incidents. The EPPRD came into effect on October 26, 2005 and is a formal legally binding agreement between PHA, the Australian Government, all state and territory governments and 27 plant industry signatories. The EPPRD is based on the following key principles:

- cost minimisation for all Parties
- reimbursement to growers whose crops or property are directly damaged or destroyed as a result of implementing an approved Response Plan
- early detection and response
- rapid responses to exotic pests - excluding weeds in the first instance
- decisions to eradicate are based on appropriate criteria (must be technically feasible and cost beneficial)
- an industry commitment to biosecurity and risk mitigation and a government commitment to best management practice
- cost sharing/payment of eligible costs
- an Agreed Limit for cost sharing (calculated as 2% of local value of production for one year of the Affected Industry Party or as defined in Schedule 14 of the EPPRD). The Agreed Limit can be exceeded with the agreement of Affected Parties.
- an effective industry/government decision-making process
- a limit in scope (to only cover exotic pest threats relevant to PHA member industries).

For further information on the EPPRD, including copies of the EPPRD, a Fact Sheet or frequently asked questions, visit www.planthealthaustralia.com.au/epprd.

Background on the onion industry

Onions are Australia's fourth largest vegetable crop, accounting for 9% of total vegetable production. The total area planted is approximately 5000 ha grown by approximately 248 growers nationally across all states of Australia. The major bulb production areas are in South Australia and Tasmania.

The major production regions in each state are:

- South Australia – Adelaide Plains, River Murray, Upper South East (Bordertown) and Lower South East (Mount Gambier)
- Tasmania – North West Coast and North East Tasmania
- Western Australia – Manjimup and Myalup
- Victoria – Western Districts (Hamilton, Casterton and Coleraine), South West (Pt. Fairy), Central South (Werribee) and Gippsland
- New South Wales – Riverina
- Queensland – Lockyer Valley, St George, Darling Downs and Fassifern Valley

Several types of onions are grown in Australia including brown, white and red onions. Onions are available all year round, however the main harvest period commences in August in Queensland and extends through to April in the southern states. The National Onion Industry Biosecurity Plan (IBP) is concerned with the commodity *Allium cepa* (onions) and does not cover other *Allium* species such as garlic or leeks, however they will be mentioned in various sections of the IBP due to their similarities and potential to host many of the pests of onions.

The onion industry in Australia is considered 'mature', and neither the value nor volume of production has changed greatly during the last 10 years. Industry statistics suggest production levels in excess of 240,000 tonnes are routinely achieved (see Table 1). The gross value of production averaged \$181 million/year between 2006 and 2008. The Australian onion industry provides for both domestic and international markets. Half of domestic market onions are grown in South Australia. Approximately 33% of the Australian onion crop (primarily from Tasmania) is exported, principally to Germany, Netherlands and United Kingdom (McKinna 2005). The value of exports has been estimated at \$27 million/year. Exporting accounted for 92% of the Tasmanian production.

There are other aspects of the onion industry in Australia namely:

1. Nursery Industry – home gardeners use transplants (supplied by commercial nurseries /retailers) or packet seeds. This probably constitutes less than 3% of total seed usage.
2. Seed Production – an estimated area of 300-400 hectares is used for seed production (25% being for hybrid seed production). Possibly an additional 100-150 growers are involved. The major areas of production include the Murrumbidgee Irrigation Area/Swan Hill/South East South Australia, Victoria and Tasmania.

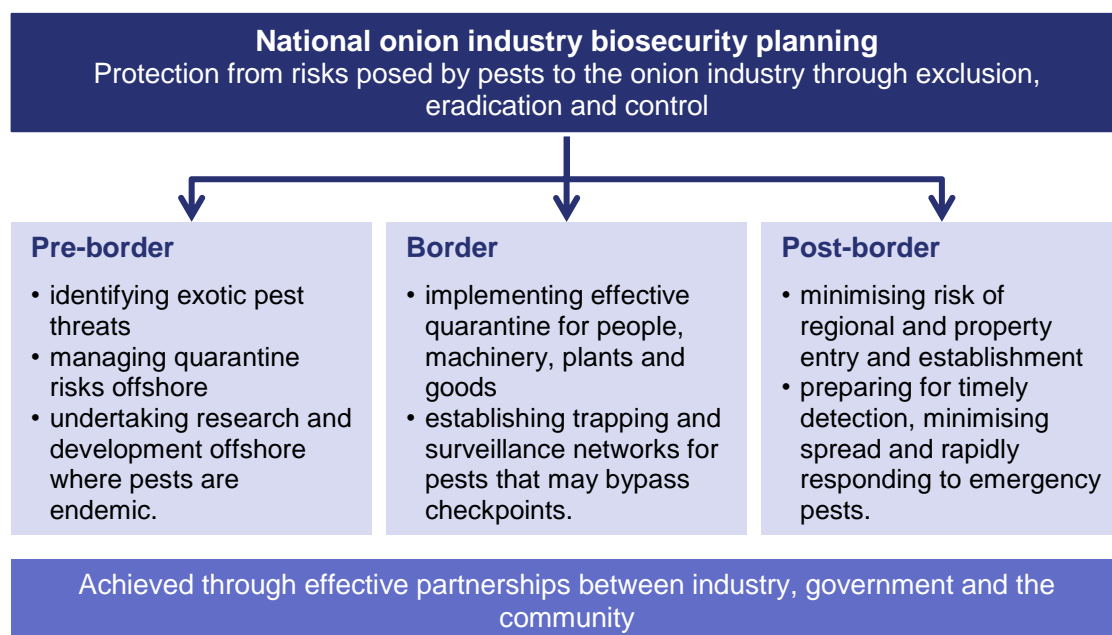
The onion industry faces challenges from a wide range of pests currently established within Australia, such as White rot, Downy mildew, Onion thrips and Cutworm, as well as a host of potential threats residing outside the national borders that will be considered in this IBP.

Table 1. Onion production statistics

	Total Production			Production by state (2008-2009)					
	2007	2008	2009	NSW	Vic	Qld	SA	WA	TAS
Production (t)	246500	254400	283800	19400	18700	28900	96100	21800	98800
Area (ha)	5413	5013	5463	526	362	915	1708	362	1591
Yield (t/ha)	46	51	52	37	52	32	56	60	62

What is industry biosecurity planning?

Industry biosecurity is the protection from risks posed by exotic pests through actions such as exclusion, eradication and control. Effective industry biosecurity relies on all stakeholders, including government agencies, industry and the public (Figure 1).

**Figure 1.** Industry biosecurity: a shared responsibility

The components of the plant industry biosecurity continuum have been identified and described in PLANTPLAN (see page 80). The incursion management plan from PLANTPLAN (2011) has been summarised in Figure 2.

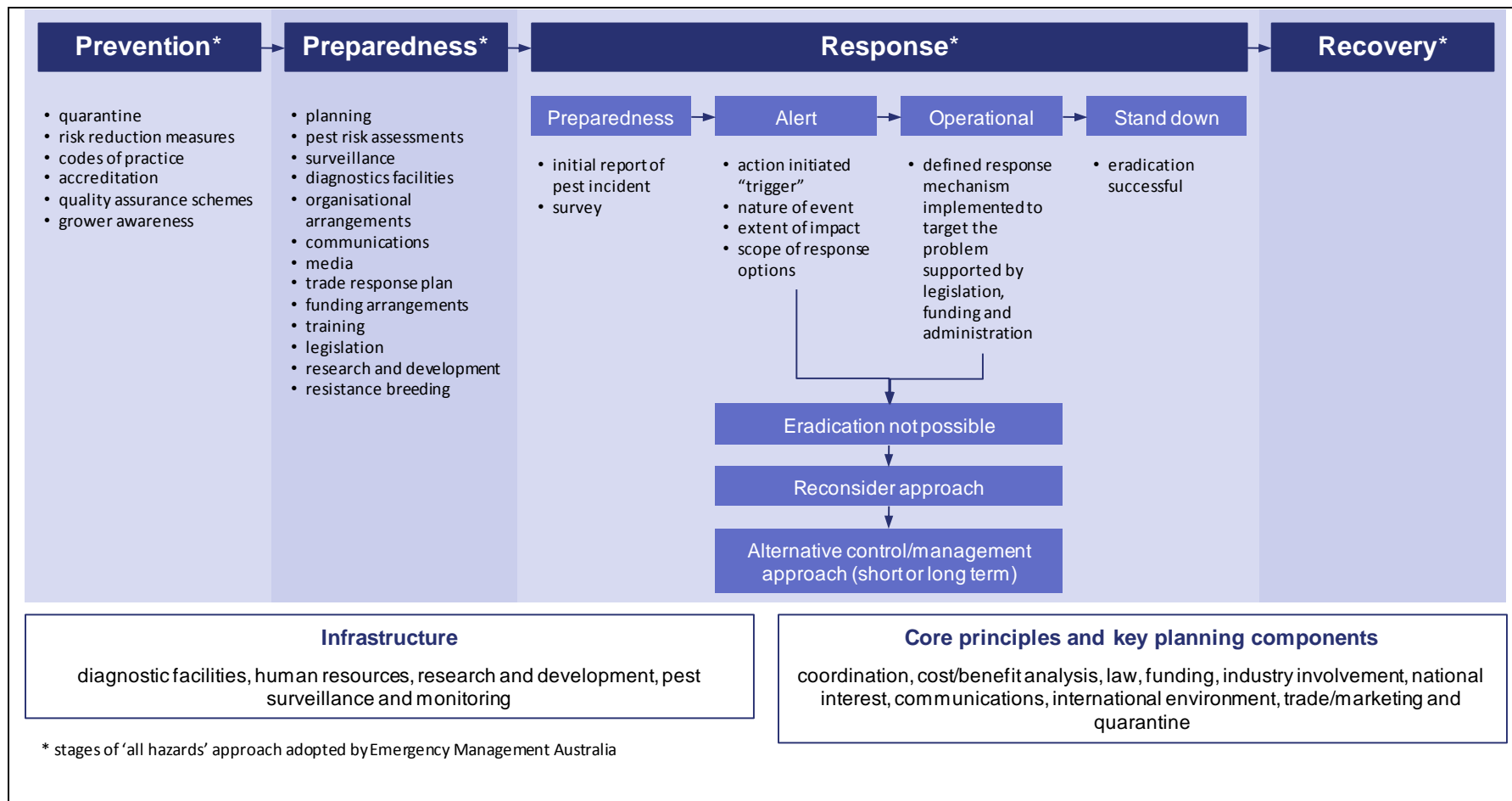


Figure 2. Summary of incursion management for plant industries according to PLANTPLAN (2011)

With the assistance of Onions Australia, an Industry Biosecurity Group (IBG), coordinated by PHA, was formed to work on the development of a national biosecurity plan for the onion industry. The IBG included representatives from Onions Australia, the Onion Industry Advisory Committee and PHA (Table 2). Other contributors to the IBP included representatives from relevant state/territory agriculture agencies (Table 3).

Table 2. *Members of the onion IBG*

Name	Organisation
Joanne Thomas-Ward	Chief Executive Officer, Onions Australia
Lechelle Earl	PA/Communications Assistant, Communications and Events Co-ordinator, Onions Australia
Richard Jones	Rathlyn Associates, Onion Industry Advisory Committee delegate for NSW
Jo Slattery	Plant Health Australia
Felicity Andriunas	Plant Health Australia

Table 3. *Scientists and others who contributed information for development of the IBP*

Name	Organisation
John Duff	Agri-Science Queensland, a part of the Department of Agriculture, Fisheries and Forestry (DAFF) Queensland
Christine Horlock	Biosecurity Queensland, a part of DAFF Queensland
Roger Shivas	Biosecurity Queensland, a part of DAFF Queensland
Denis Persley	DAFF Queensland
Jianhua Mo	Department of Primary Industries (DPI) Agriculture NSW
Andrew Watson	DPI Biosecurity NSW
Lloyd Kingham	DPI Biosecurity NSW
Stephen Johnson	DPI Biosecurity NSW
Bill Washington	Department of Primary Industries Victoria (DPI Vic)
David Madge	DPI Vic
Liz Minchinton	DPI Vic
Barbara Hall	South Australian Research & Development Institute (SARDI)

Key steps in the development of the onion IBP included:

- identifying and documenting key threats to the onion industry
- confirming an agreed emergency plant pest priority list
- documenting pest-specific contingency plans for high priority pests (HPP)
- documenting the roles and responsibilities of stakeholder groups.

Document overview

The biosecurity package developed for the Australian onion industry focuses on a number of key areas.

Threat identification, pest risk assessments and incursion management funding arrangements

Guidelines are provided for the identification and categorisation of biosecurity threats through a process of qualitative risk assessment. The primary goal is to coordinate identification of exotic pest threats that could impact on productivity, sustainability and marketability and to assess their potential impacts. This plan strengthens risk assessment work already being done both interstate and overseas. Key onion biosecurity threats are detailed in threat summary tables (TST; Appendix 1), along with the plant pest threat priority list (the top ranked threats to the onion industry).

Risk mitigation plan

This section provides a summary of activities to mitigate the impact of pest threats on the Australian onion industry, along with a set of guidelines for managing risk at all operational levels. Many pre-emptive practices can be adopted by plant industries and government agencies to reduce risks. These include:

- surveillance, awareness and training activities
- exclusion activities
- propagation of high health status planting materials only
- destruction of crop residues
- control of vectors
- control of alternative hosts and weeds
- procedures for transporting produce

- use of warning and information signs
- use of dedicated equipment when working in high risk areas, or appropriate disinfestation protocols
- restricting the use of high risk vehicles during high risk times
- reporting suspect pests to appropriate authorities
- including farm biosecurity in Industry Best Management Practice (IBMP) and Quality Assurance (QA) schemes.

Contingency plans and response management procedures

PHA has coordinated the development of PLANTPLAN, a generic emergency response plan for the Australian plant industries. PLANTPLAN details the procedures required and the organisations responsible in the event of an incursion of an emergency plant pest. Pest-specific contingency plans may be developed as a result of the pest threats identified in this plan.

Review processes

With the support of the IBG, PHA is responsible for reviewing this plan on a 3-4 year basis. The review process will be used to determine:

- strategies to maximise the adoption of recommended practices
- where further improvements can be made
- revisions/updates to the plan
- where resources should be allocated to improve the plan.

Biosecurity implementation

The onion IBP provides a framework for the implementation of biosecurity practices within the industry. Currently a range of biosecurity practices are undertaken within the onion industry and these are outlined in the Risk Mitigation Plan (page 41). Further implementation within the framework of the IBP, such as those practices outlined in Figure 3 should be investigated to increase preparedness in the industry.

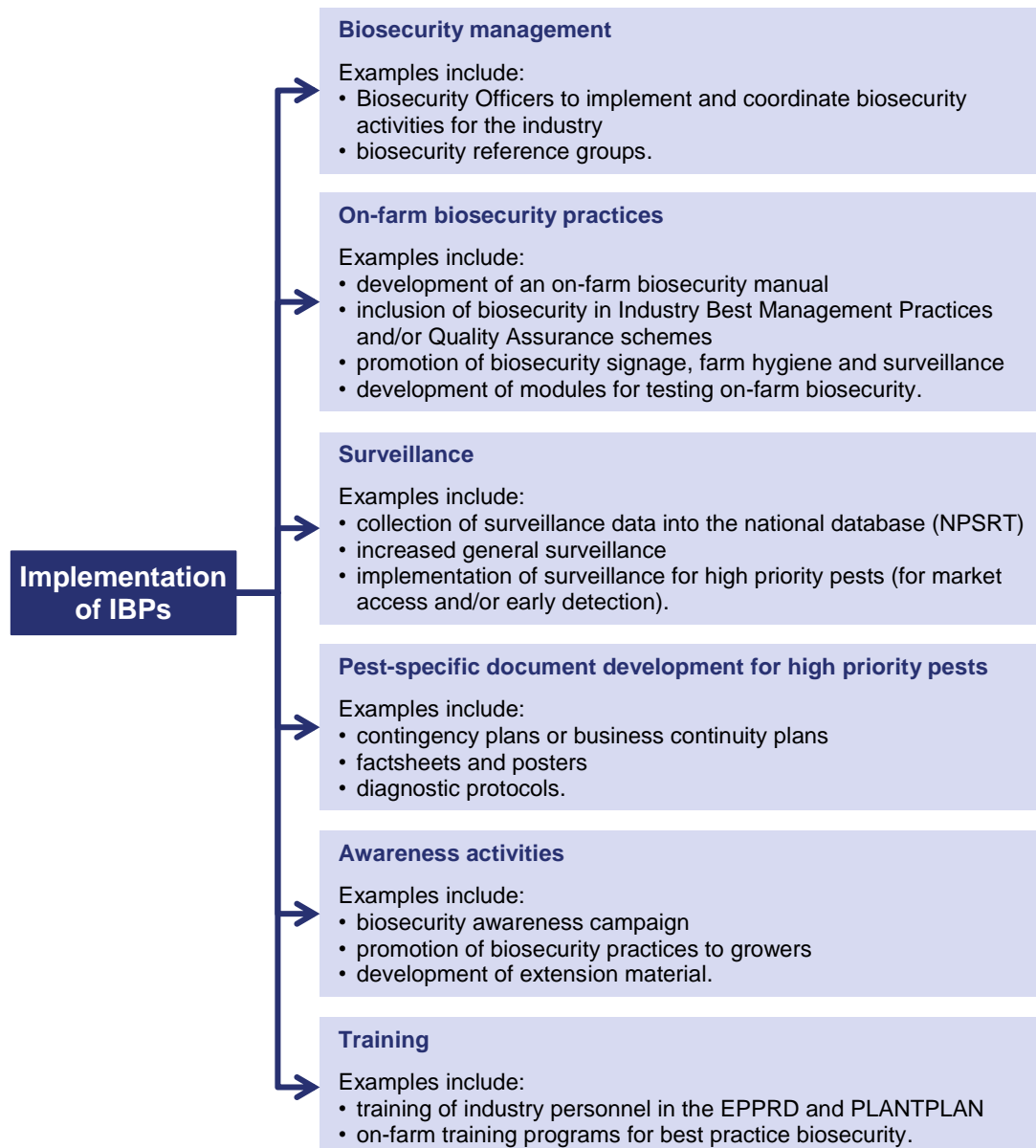


Figure 3. Potential biosecurity implementation activities within the framework of the IBP

Through the review of the onion IBP, a list of biosecurity action items to be considered by stakeholders in the industry has been developed (Table 4). This list is intended to provide proposed or potential biosecurity priorities for the onion industry that are gaps in the current activities listed in the Risk Mitigation section of the IBP. Future versions of this document will contain information on the progress made on the listed items.

Table 4. Biosecurity action items identified by the onion industry

Action item	Details
Training in responsibilities for committee members and Industry Liaison Officers	At a committee level, a checklist of roles for individual committee members in the event of an incursion. At a regional level, identification and training of potential Industry Liaison Officers (ILOs) in Deed responsibilities and duties as an ILO should an incursion occur.
Development of on-farm biosecurity training packages	Training through the provision of an on-farm biosecurity manual, fact sheets on HPPs, and stressing the importance of regular pest checks with records (and benefits to market access). On-farm training should also outline the compensation process to give growers confidence in the system and the desire to notify the State government agency if an incursion occurs.
Industry members protection from litigation	Investigate the legal ramifications of decisions made by the IBG on individual members and examine insurance options.
Investigate levies to cover biosecurity related activities	Investigate a positive levy to cover the Deed, or levies to cover production of biosecurity training and awareness material or possible biosecurity simulations in each state.
Emergency registration of chemicals for HPPs	Identification of chemical control requirements for HPP threats and their availability in Australia. Where required, advanced applications for emergency chemical registrations should be prepared and submitted to the Australian Pesticides and Veterinary Medicines Authority (APVMA). This should be a collaborative process between state governments and the onion industry.

**THREAT
IDENTIFICATION, PEST
RISK ASSESSMENTS
AND INCURSION
MANAGEMENT
FUNDING
ARRANGEMENTS**

Introduction – threat identification and incursion management

This section identifies high risk exotic pest threats to the onion industry, and presents a framework for assessing the potential economic, social and environmental impacts associated with each threat. This part of the biosecurity plan uses a nationally consistent and coordinated approach to threat identification and risk assessment to provide a strong base for future risk management in the onion industry.

By identifying key threats a pre-emptive approach may be taken to risk management. Under this approach, mechanisms can be put into place to increase our response effectiveness if pest incursions occur. One such mechanism is the EPPRD that has been negotiated between PHA's government and industry members. The EPPRD ensures reliable and agreed funding arrangements are in place in advance of emergency plant pest incursions, and assists in the response to emergency plant pest incursions, particularly those identified as key threats.

Identification of high risk pests will also assist in the implementation of effective grower and community awareness campaigns, targeted biosecurity education and training programs for growers and diagnosticians, and development of pest-specific incursion response plans.

Threat identification

Information on biosecurity threats to the onion industry described in this document came from a combination of:

- past records
- existing industry protection plans
- relevant experience
- industry practice and experience
- relevant published literature
- local industry and overseas research
- specialist and expert judgment.

At this time, only invertebrate pests (insects, mites, molluscs and nematodes) and pathogens (disease causing organisms) have been identified, although the issue of weeds may be revisited through future reviews of this plan.

Ranking pest threats

Key questions required for ranking the importance of pests include the following:

- What are the probabilities of entry into Australia, establishment and spread, for each pest?
- What are the likely impacts of the pest on cost of production, overall productivity, and market access?
- How difficult is each pest to identify and control and/or eradicate?

The TSTs (Appendix 1) present a list of potential plant pest threats to the onion industry and provide summarised information on entry, establishment and spread potential, the economic consequences of establishment and eradication potential (where available).

While there are similarities in the ranking system used in this document and the Import Risk Analysis (IRA) process followed by the Department of Agriculture, Fisheries and Forestry (DAFF), an important distinction is that this document considers all potential pathways by which an exotic pest could enter Australia, including illegal pathways and natural spread. The methods used here also provide different guidance to assignment of qualitative probabilities when compared with DAFF's IRA process.

The most serious threats from the TSTs were identified through a process of qualitative risk assessment and are listed in Table 5.

Description of terms used in pest risk tables

The descriptions below relate to terms in Table 5.

Life form legend

Bac	Bacteria
Fly	Flies and Midges (DIPTERA)
Fun	Fungi
Mite	Mites e.g. spider and gall mites (ACARI)
Thri	Thrips (THYSANOPTERA)

Entry potential

Negligible	The probability of entry is extremely low given the combination of factors including the distribution of the pest source, management practices applied, low probability of pest survival in transit and limited pathways for pest entry.
Low	The probability of entry is low, but clearly possible given the expected combination of factors described above.
Medium	Pest entry is likely given the combination of factors described above.
High	Pest entry is very likely or certain given the combination of factors described above.
Unknown	The pest entry potential is unknown or very little of value is known.

Establishment potential

Negligible	The pest has no potential to survive and become established.
Low	The pest has the potential to survive and become established in approximately one-third or less of the range of hosts. The pest could have a low probability of contact with susceptible hosts.
Medium	The pest has the potential to survive and become established in between approximately one-third and two-thirds of the range of hosts.
High	The pest has potential to survive and become established throughout most or all of the range of hosts. Distribution is not limited by environmental conditions that prevail in Australia. Based upon its current world distribution, and known conditions of survival, it is likely to survive in Australia wherever major hosts are grown.
Unknown	The establishment potential of the pest is unknown or very little of value is known.

Spread potential

Negligible	The pest has no potential for natural spread.
Low	The pest has potential for natural spread locally.
Medium	The pest has potential for natural spread throughout a physiographic region.
High	The pest has potential for natural spread to all production areas.
Unknown	The spread potential is unknown or very little of value is known.

Economic impact

Negligible	There is no impact on yield, host longevity, production costs, storage or market access.
Low	There is minor impact on standing crop, stored product or market access.
Medium	There is moderate impact on crops, but host mortality is rare, and storage losses and/or moderate impacts on market access may occur.
High	There is severe impact on standing crop, with significant host mortality and/or storage losses and/or severe impacts on market access.
Extreme	There is extreme impact on standing crop, with extreme host mortality and/or storage losses and/or extreme impacts on market access.
Unknown	The economic potential of the pest is unknown or very little of value is known.

Onion industry high priority plant pest threat list

Table 5 provides an overview of the top ranked threats to the onion industry. Further details on each pest along with the basis for the likelihood ratings are provided in the TST (Appendix 1). Assessments may change given more detailed research, and the priority list will be reviewed with the Biosecurity Plan on a 3-4 year basis. An explanation of the method used for calculating the overall risk can be found on the PHA website¹.

Table 5. Onion industry high priority plant pest threat list

Common name	Life form	Scientific name	Primary host	Plant part affected	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Rusts	Fun	<i>Puccinia</i> spp. (exotic species) ²	<i>Allium</i> spp.	Foliage	HIGH	HIGH	HIGH	EXTREME	EXTREME
Leaf blight ³	Fun	<i>Botrytis squamosa</i>	Onion, Japanese bunching onion, Welsh onion, leek and garlic	Foliage, seed	HIGH ⁴	MEDIUM	HIGH	HIGH	HIGH
Leaf spot ⁵	Fun	<i>Cladosporium allii</i>	Onion, shallot, chive, garlic and leek	Foliage	HIGH ⁶	HIGH ⁷	HIGH	HIGH ⁸	HIGH
Onion fly ⁹	Fly	<i>Delia antiqua</i>	Onion, shallot, Japanese bunching onion or Welsh onion, leek, garlic and chives	Bulb, foliage, root, seedling	HIGH ¹⁰	MEDIUM	HIGH	HIGH ¹¹	HIGH

¹ Available from www.planthealthaustralia.com.au/go/phau/biosecurity/general-biosecurity-information

² As a group, *Puccinia* spp. on *Allium* spp. are not well understood

³ Synonyms: Leaf rot/blast, Neck rot

⁴ Detected at border on several occasions

⁵ Synonym: Leaf blotch

⁶ Many *Cladosporium* species are frequently isolated from onion seed

⁷ Australian conditions would favour this disease

⁸ Disease has severe impact on the standing crop when it becomes prevalent, and it would be expected to establish particularly in southern growing areas

Common name	Life form	Scientific name	Primary host	Plant part affected	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Bean fly¹²	Fly	<i>Delia florallega</i>	Onion, leek, garlic, <i>Brassicaceae</i> , tomato, potato and corn	Bulb, seedling	HIGH	MEDIUM	HIGH	HIGH ¹³	HIGH
Onion bulb fly¹⁴	Fly	<i>Eumerus amoenus</i>	Onion	Bulb	HIGH ¹⁵	MEDIUM	HIGH	HIGH	HIGH
Lesser bulb fly¹⁶	Fly	<i>Eumerus strigatus</i>	Onion and garlic	Bulb	HIGH ¹⁷	HIGH	HIGH	HIGH ¹⁸	HIGH
American leafminer¹⁹	Fly	<i>Liriomyza sativae</i>	Polyphagous; <i>Allium</i> spp., bean, pea, potato and tomato	Foliage	HIGH	HIGH	MEDIUM	HIGH	HIGH
Allium leafminer	Fly	<i>Phytomyza gymnostoma</i>	Onion, leek, garlic and chives	Stalk and bulb	HIGH	MEDIUM	HIGH	HIGH	HIGH
Bulb mite	Mite	<i>Rhizoglyphus callae</i>	Onion, shallot and garlic	Bulb	HIGH	HIGH	HIGH ²⁰	HIGH	HIGH
Bulb mite	Mite	<i>Rhizoglyphus setosus</i>	Onion, leek and garlic	Bulb	HIGH	HIGH	HIGH ²⁰	HIGH	HIGH
Onion thrips²¹	Thri	<i>Thrips tabaci</i> (exotic strains/biotypes) ²²	Wide host range including onion, garlic, leek, shallot, horseradish, daisy, cotton and cucurbits	Foliage, bulb, flower	HIGH ²³	HIGH	HIGH ²⁴	MEDIUM - HIGH ²⁵	MEDIUM - HIGH

⁹ Synonym: Onion maggot

¹⁰ Larvae imported inside bulbs

¹¹ Particularly for crops establishing

¹² Synonyms: Bean seed maggot, Potato maggot, Turnip maggot

¹³ High impact on seeds and seedlings

¹⁴ Synonym: Mediterranean lesser bulb fly

¹⁵ Risk of the pupae adhering to the bulbs and larvae being present in damaged bulbs

¹⁶ Synonyms: Onion bulb fly, Small narcissus fly

¹⁷ Detections already made at border

¹⁸ Pest of onions grown from seed

¹⁹ Synonyms: Vegetable leafminer, Cabbage leafminer, Leafminer of vegetables, Melon leafminer, Serpentine vegetable leafminer

²⁰ Wide host range and spreads via contaminated plant material and soil

²¹ Synonym: Potato thrips

Common name	Life form	Scientific name	Primary host	Plant part affected	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Xanthomonas leaf blight	Bac	<i>Xanthomonas axonopodis</i> pv. <i>allii</i>	Onion, garlic, leek, chives, shallot and Welsh onion	Foliage	HIGH ²⁶	MEDIUM ²⁷	HIGH ²⁸	MEDIUM ²⁹	MEDIUM

²² *Thrips tabaci* are present in Australia, however there are more damaging strains/biotypes that are not currently present Australia. *T. tabaci* strains vector viruses including *Iris yellow spot virus* which has limited distribution in Australia.

²³ Intercepted on imported plant products from 54 plant genera and 23 countries

²⁴ Distributed very long distances by wind and air currents

²⁵ In the US losses of 25-50% reported in onion crops. Total losses may occur in onions at the seedling stage. High impact on onion seed crops, with severe losses in seed production to *T. tabaci* feeding on flowers.

²⁶ May be introduced on bulbs for planting from countries where bacteria occurs

²⁷ The disease is favoured by high temperatures (higher than 27°C) and severe outbreaks usually occur shortly (7 to 10 days) after a period of humid, rainy weather. Can survive between crops on weeds and crops such as dry bean, alfalfa and other legumes

²⁸ Seed transmitted. Also spread by wind and irrigation. May be disseminated on plant material and clothes etc.

²⁹ In USA, yield reductions ranging from 10 to 50% have been observed. Seedling infection in tropical climates can result in crop failure.

Current resources for detection and identification of high priority pests

Diagnostic and surveillance capacity for the HPPs of the onion industry (Table 5) supports Australia's preparedness and ability to respond to them should they be detected. A summary of this capacity is shown in Table 6, which lists the formal active surveillance programs and the status of national diagnostic protocols developed for each of the onion HPPs.

Development of national diagnostic protocols is managed through the Subcommittee on Plant Health Diagnostic Standards (SPHDS). While diagnostic capacity may exist in Australia in the absence of these documents, an endorsed national diagnostic protocol provides a consistent and agreed diagnostic approach for identifying new pests. Further information on these documents can be found on page 86.

Table 6. Diagnostic protocols and surveillance programs for high priority pests³⁰

Common name	Life form	Scientific name	National diagnostic protocol	Surveillance programs
Leaf blight	Fun	<i>Botrytis squamosa</i>	Not developed	None known at present
Leaf spot	Fun	<i>Cladosporium allii</i>	Not developed	None known at present
Onion fly	Fly	<i>Delia antiqua</i>	Not developed	None known at present
Bean fly	Fly	<i>Delia florilega</i>	Not developed	None known at present
Onion bulb fly	Fly	<i>Eumerus amoenus</i>	Not developed	None known at present
Lesser bulb fly	Fly	<i>Eumerus strigatus</i>	Not developed	None known at present
American leafminer	Fly	<i>Liriomyza sativae</i>	Lucid key ³¹	Northern Australian Quarantine Strategy (NAQS) Pest and Disease Survey – Australia's northern coastline from Cairns to Broome (Qld, NT and WA), including the Torres Strait – natural environments, agricultural and community regions and ports of entry
Allium leafminer	Fly	<i>Phytomyza gymnostoma</i>	Not developed	None known at present
Rusts	Fun	<i>Puccinia</i> spp. (exotic species)	Not developed	None known at present
Bulb mite	Mite	<i>Rhizoglyphus callae</i>	Not developed	None known at present
Bulb mite	Mite	<i>Rhizoglyphus setosus</i>	Not developed	None known at present
Onion thrips	Thri	<i>Thrips tabaci</i> (exotic strains)	Not developed	None known at present

³⁰ Information presented has been taken from the National Plant Health Status Report 2011 and confirmed or updated through either Plant Health Committee, the Subcommittee on Plant Health Diagnostic Standards, the Subcommittee on National Plant Health Surveillance or other stakeholders

³¹ A lucid key is an interactive matrix comprising a list of entities and a list of features and states describing or otherwise associated with them, score data relating the feature states to the entities, and various images and/or HTML pages attached to the features, states and/or entities

Common name	Life form	Scientific name	National diagnostic protocol	Surveillance programs
Xanthomonas leaf blight	Bac	<i>Xanthomonas axonopodis</i> pv. <i>allii</i>	Not developed	None known at present

Pests of limited distribution

Table 7 provides details on priority pests of the onion industry that are currently present in Australia and have limited distribution. This list will be reviewed with the IBP.

Table 7. Pests identified as priority that are of limited distribution within Australia

Common name	Life form	Scientific name	Hosts	Distribution in Australia	Plant part affected	Comments
Iris yellow spot	Vir	<i>Iris yellow spot virus</i> ³²	Onion, Welsh onion, garlic, shallot, leek, chives, <i>Rosa</i> spp., <i>Rubus</i> spp., ornamentals (<i>Hippeastrum</i> , <i>Lisianthus</i> , <i>Alstroemeria</i> spp., Inca lily, iris, geranium, dandelion, purslane, chrysanthemum) and weed species (green foxtail, common vetch)	NSW, WA and Vic	Foliage	Industry funded national survey of <i>Iris yellow spot virus</i> distribution is currently underway.
Onion rust ³³	Fun	<i>Puccinia porri</i> ³⁴	<i>Allium</i> spp.	NSW, Qld, Tas and Vic	Foliage	
Onion smut	Fun	<i>Urocystis cepulae</i>	Onion, spring onion, shallot, leek, garlic and crow garlic	SA	Whole plant, seedling	South Australia has four quarantine areas where Onion smut is under eradication. There have been no detections of Onion smut since 2002. Proof of freedom for all quarantine areas will be officially confirmed in October 2017.

³² Transmitted by Onion thrips (*Thrips tabaci*)

³³ Synonym: Garlic rust

³⁴ Synonyms: *P.allii*, *P.mixta*

Pests requiring more research

Pests listed in Table 8 have been identified by the onion industry as a priority for additional research to determine their threat to onions.

Table 8. Pests identified as priority that require more research

Common name	Life form	Scientific name	Primary host	Plant part affected
Rusts	Fun	<i>Puccinia</i> spp. (exotic species) ³⁵	<i>Allium</i> spp.	Foliage
Onion thrips ³⁶	Thri	<i>Thrips tabaci</i> (exotic strains) ³⁷	Wide host range including onion, garlic, leek, shallot, horseradish, daisy, cotton, cucurbits and black pepper	Foliage, bulb, flowers

Pest risk assessments

The assessment process used in this IBP was developed in accordance with the International Standards for Phytosanitary Measures (ISPM) No. 2 and 11 [Food and Agriculture Organization of the United Nations (FAO), 2004; 2007]. A summary of the pest risk analysis protocol followed in this IBP is shown in Table 9, and the complete protocol used for pest risk analysis in this IBP can be found on the PHA website³⁸.

While there are similarities in the ranking system used in this document and the IRA process followed by DAFF, there are differences in the underlying methodology and scope of consideration that may result in different outcomes between the two assessment systems. This includes different guidance to assignment of qualitative probabilities when compared with DAFF's IRA process.

³⁵ As a group, the complex of *Puccinia* spp. that infect *Allium* spp. are not well understood and require further investigation to determine the specific species that cause damage to onions

³⁶ Synonym: Potato thrips

³⁷ Some strains or biotypes of *Thrips tabaci* are more damaging than others. Further research is required to determine the threat of exotic strains to onions.

³⁸ Available from www.planthealthaustralia.com.au/go/phau/biosecurity/general-biosecurity-information

Modifications of the Biosecurity Australia (2009) protocol have been made to suit the analysis required in the IBP development process, including, but not limited to:

- **Entry potential:** The determination of entry potential in this IBP takes into account multiple possible pathways for the legal importation of plant material as well as illegal pathways, contamination and the possibility of introduction through natural means such as wind. Therefore the scope is wider than that used by DAFF in their IRA process, which only considers legal importation of plants or plant commodities.
- **Potential economic impact** of pest establishment in this document only takes into account the impacts on the onion industry. The DAFF IRA process has a wider scope, including the effects to all of Australia's plant industries, trade, the environment and public health.
- **Risk potentials and impacts:** The number of categories used in this IBP for describing the entry, establishment, spread, and potential economic impact (see 'Description of terms used in pest risk tables', page 24) differs in comparison to that used in Biosecurity Australia (2009).

Table 9. Summary of pest risk assessment process used in IBPs

Step 1	Clearly identify the pest	<ul style="list-style-type: none"> • Generally pest defined to species level • Alternatively a group (e.g. family, genus level) can be used • Sub-species level (e.g. race, pathovar, etc.) may be required
Step 2	Assess entry, establishment and spread likelihoods	<ul style="list-style-type: none"> • Assessment based on current system and factors • Negligible, low, medium, high or unknown ratings
Step 3	Assess likely consequences	<ul style="list-style-type: none"> • Primarily based on likely economic impact to industry based on current factors • Negligible, low, medium, high, extreme or unknown ratings
Step 4	Derive overall risk	<ul style="list-style-type: none"> • Entry, establishment and spread likelihoods are combined to generate a likelihood score • Likelihood score combined with the likely economic impact to generate an overall risk score
Step 5	Review the risk	<ul style="list-style-type: none"> • Risk ratings should be reviewed with the IBP

The objective of risk assessment is to clearly identify and classify biosecurity risks and to provide data to assist in the evaluation and treatment of these risks. Risk assessment involves consideration of the sources of risk, their consequences, and the likelihood that those consequences may occur. Factors that affect the consequences and likelihood may be identified and addressed via risk mitigation strategies.

Risk assessment may be undertaken to various degrees of refinement, depending on the risk information and data available. Assessment may be qualitative, semi-quantitative, quantitative,

or a combination of these. The complexity and cost of assessment increases with the production of more quantitative data. It is often more practical to first obtain a general indication of the level of risk through qualitative risk assessment, and if necessary, undertake more specific quantitative assessment later [Australian Standard/New Zealand Standard (AS/NZS)-4360, 1999].

Formal Categorisation of pests for inclusion in the Emergency Plant Pest Response Deed

The following section outlines the EPPRD between all government and most industry members of PHA. The EPPRD aims to manage the impact of EPPs by establishing an industry/government agreement to cover eradication of emergency pests, reducing delays in securing funding, providing industry with greater involvement in eradication efforts, and removing disincentives to report emergency pests. Onions Australia is the peak Australian onion industry body and became a member of PHA (and signatory to the EPPRD) in March 2008.

The EPPRD only covers eradication responses to EPPs when based on an approved EPP Response Plan. Weeds are not covered by the EPPRD at this stage. Under the EPPRD, both industry and government contribute to the total cost of an approved EPP Response with the ratio of contribution based on the Category of the EPP (Table 10). The Category of the EPP is determined by the Categorisation Group and is based on the relative public versus private benefits of eradication of the EPP.

A copy of the EPPRD can be downloaded from the PHA website (www.planthealthaustralia.com.au/go/phau/epprd).

Pest categorisation

The EPPRD outlines a mechanism whereby Industry and Government Parties will contribute to the total cost of a response to an EPP Incident based on agreed Categories. These Categories determine the ratio each party will pay, based on the relative public and private benefits of EPP eradication. Four Categories are included in the EPPRD, as outlined in Table 10 and Figure 4.

Categorisation of a pest is carried out to determine the Parties that are most affected and who will therefore be the beneficiaries of an eradication response. It does not indicate its likelihood of eradication or its overall importance i.e. a pest listed as Category 1 is not deemed to be any more or less important than a pest listed as Category 4.

Pests listed in the HPP threat list (Table 5) may be put forward for categorisation and inclusion in Schedule 13 of the EPPRD. Other pests identified in TST or identified via other means as being priority pests may also be categorised, if required. The process for requesting categorisation of a pest is set out in Schedule 3 of the EPPRD.

Pests that enter Australia, but which have not been formally categorised will be treated as belonging to Category 3 until an appropriate Category has been formally determined.

The Categorisation Group will be responsible for determining a cost sharing Category applicable for HPPs. Only pests meeting the Emergency Plant Pest criteria will be considered for categorisation. Taking into account relevant scientific and other knowledge and experience, the Categorisation Group will consider requests for pest categorisation, re-categorisation or removal from Schedule 13 of the EPPRD. Figure 4 outlines the decision-making process used by the Categorisation Group in deciding pest Categories.

When more than one industry is affected by an EPP, the Categorisation Group will also determine, and when requested, will review the Funding Weight for each industry. Funding Weights provide a means for calculating each industry's Proportional Share of the total industry contribution if a pest affects multiple industry Parties.

Table 10. Cost sharing categories

Category	Description	Funding share
Category 1: Very high public benefits	Pest which if not eradicated would: <ul style="list-style-type: none"> • cause major environmental damage to natural ecosystems; and/or • potentially affect human health or cause a major nuisance to humans; and/or • cause significant damage to amenity flora; and • have relatively little impact on commercial crops. • This category also covers situations where the pest has a very wide range of hosts including native flora and there is considerable uncertainty as to the relative impacts on the different crops. In short, it is almost impossible to properly determine which industries benefit from eradication and to what extent, and in any case, the incursion primarily affects native flora and/or amenity plants, and/or is a major nuisance if not a health risk to humans. 	100% Government
Category 2: High public benefits	Pest which if not eradicated would: <ul style="list-style-type: none"> • cause significant public losses either directly through serious loss of amenity and/or environmental values and/or effects on households or indirectly through very severe economic impacts on regions and the national economy, through large trade losses with flow on effects through the economy; and • also impose major costs on the industries concerned so that these industries would significantly benefit from eradication. 	80% Government 20% Industry
Category 3: Moderate public benefits	Pest which if not eradicated would: <ul style="list-style-type: none"> • primarily harm the industries concerned but there would also be some significant public costs as well (that is, moderate public benefits from eradication). In this case the pest could adversely affect public amenities, households or the environment, and/or could have significant, though moderate trade implications and/or national and regional economic implications. 	50% Government 50% Industry
Category 4: Mostly if not wholly private benefits	Pest which if not eradicated would: <ul style="list-style-type: none"> • have little or no public cost implications and little or no impacts on natural ecosystems. The affected commercial industries would be adversely affected primarily through additional costs of production, through extra control costs or nuisance costs; and • generally there would be no significant trade issues that would affect national and regional economies. 	20% Government 80% Industry

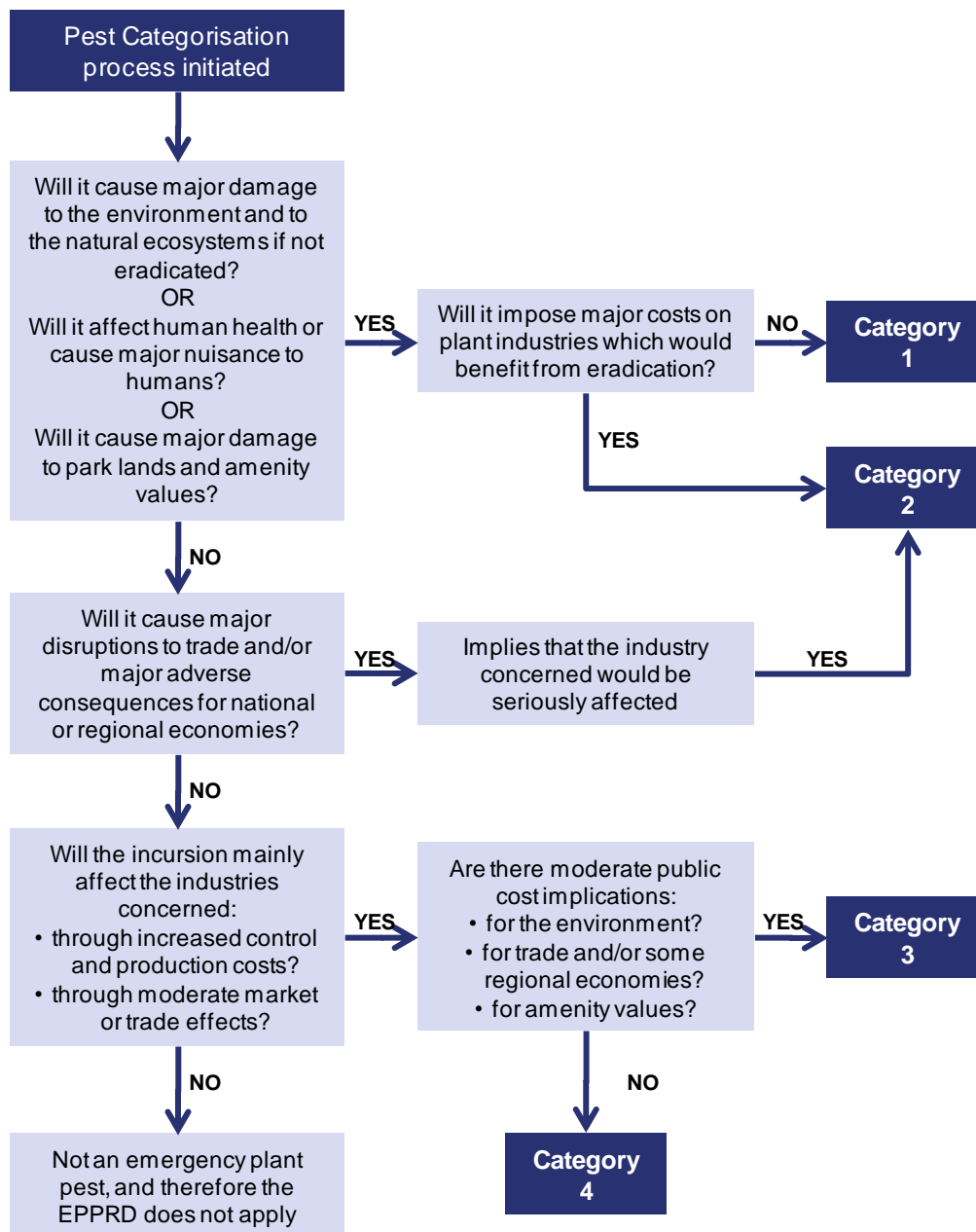


Figure 4. Summarised pest categorisation decision tree

Composition of the Categorisation Group

As described in Part 4 of Schedule 8 of the EPPRD, the membership of the Categorisation Group for each industry will comprise (at a minimum):

- an independent chair from PHA
- a standing representative of Industry Parties
- three technical experts [people with specific expertise in the areas of plant pathology or entomology], one nominated by the Australian Government, one nominated by the states/territories and one nominated by plant industry(s)
- a person with relevant economic expertise including social, trade and regional impact assessment
- a nominee from each plant industry or industries affected by the exotic plant pest being categorised.

The Categorisation Group may also seek advice from:

- a person with human health expertise, if a public health risk may exist
- a conservation representative (e.g. Australian Government Department of Environment and Heritage) or
- other relevant members determined by the independent chair.

Advisers who have specific expertise may accompany members of the Categorisation Group, but will not be part of the decision-making process.

Onion Emergency Plant Pests categorised to date

EPPs for the onion industry that have received formal pest categorisation (included within Schedule 13 of the EPPRD) are listed in Table 11. For the latest version of Schedule 13, refer to the EPPRD version found at www.planthealthaustralia.com.au/go/phau/epprd.

Table 11. Formal categories for pests of the onion industry as listed in the EPPRD (as at September 2012)

Common name	Scientific name	Formal Category
American leafminer	<i>Liriomyza sativae</i>	3
Western plant bug	<i>Lygus hesperus</i>	4

References

AS/NZS-4360 (1999) Risk Management. Standards Association of Australia, Strathfield, NSW.

Biosecurity Australia (2009) Draft pest analysis report for '*Candidatus Liberibacter psyllae*' in fresh fruit, potato tubers, nursery stock and its vector the tomato-potato psyllid. Biosecurity Australia, Canberra.

FAO (2004) Pest risk analysis for quarantine pests including analysis of environmental risks and living modified organisms. International Standards for Phytosanitary Measures No. 11. Secretariat of the International Plant Protection Convention, Food and Agriculture Organization of the United Nations, Rome.

FAO (2007) Framework for pest risk analysis. International Standards for Phytosanitary Measures No. 2. Secretariat of the International Plant Protection Convention, Food and Agriculture Organization of the United Nations, Rome.

RISK MITIGATION PLAN

Introduction – risk mitigation

There are a number of strategies that can be adopted to help protect and minimise the risks of exotic and emergency pests under International Plant Protection Convention (IPPC) standards (www.ippc.int/IPPC/En/default.jsp) and Commonwealth and State legislation.

Many pre-emptive practices can be adopted to reduce the risk of exotic pest movement for the onion industry (Figure 5). Such risk mitigation practices are the responsibility of governments, industry and the community.

A number of key risk mitigation areas are outlined in this guide, along with summaries of the roles and responsibilities of the Australian Government, state/territory governments, and onion industry members. This section is to be used as a guide outlining possible activities that may be adopted by industry and growers to mitigate risk. Each grower will need to evaluate the efficacy of each activity for their situation.

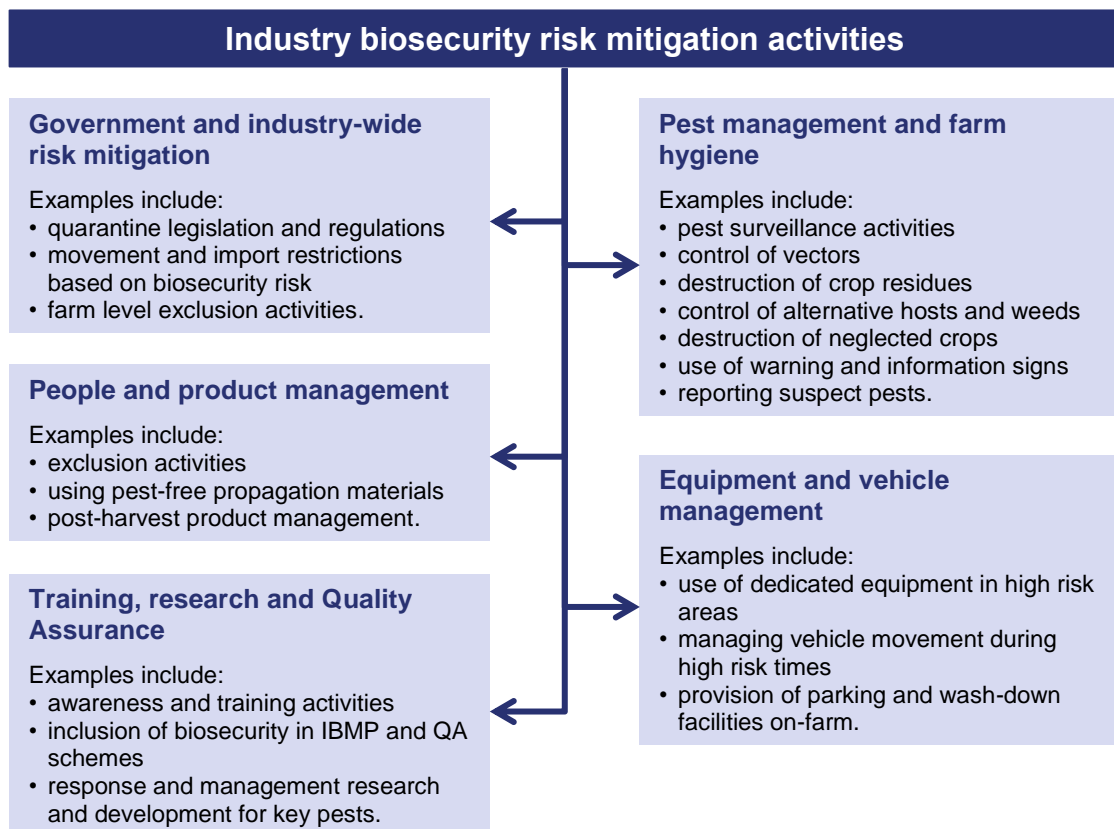


Figure 5. Examples of biosecurity risk mitigation activities

Barrier quarantine

Barrier quarantine should be implemented at all levels of the onion industry including national, state, regional, and farm levels.

National level – importation restrictions

Responsibility > Australian Government

DAFF is the Australian Government department responsible for maintaining and improving international trade and market access opportunities for agriculture, fisheries, forestry, and food industries. DAFF achieves this through:

- establishment of scientifically-based quarantine policies
- provision of effective technical advice and export certification services
- negotiations with key trading partners
- participation in multilateral forums and international sanitary and phytosanitary (SPS) standard-setting organisations
- collaboration with portfolio industries and exporters.

DAFF is responsible for developing biosecurity (SPS) risk management policy and reviewing existing quarantine measures for the importation of live animals and plants, and animal and plant products. In particular, DAFF undertakes import risk analyses to determine which products may enter Australia, and under what quarantine conditions. DAFF also consults with industry and the community, conducting research and developing policy and procedures to protect Australia's animal and plant health status and natural environment. In addition, DAFF assists Australia's export market program by negotiating other countries' import requirements for Australian animals and plants. Further information can be found at www.daff.gov.au.

The administrative authority for national quarantine is vested in DAFF under the *Quarantine Act 1908*. Quarantine policies are developed on the basis of an IRA process. This process is outlined in the Import Risk Analysis Handbook 2011 (DAFF, 2011). DAFF maintains barrier quarantine services at all international ports and in the Torres Strait region. The management of quarantine policy, as it relates to the introduction into Australia of fruit, seed, or other plant material, is the responsibility of DAFF.

The Schedule 5 "Permitted Seeds" list from the *Quarantine Proclamation 1998* is maintained on the Import Conditions (ICON) database at www.aqis.gov.au/icon. ICON contains the

current Australian import conditions for more than 20,000 foreign plants, animal, mineral and human products and is the first point of access to information about Australian import requirements for a range of commodities. It can be used to determine if a commodity intended for import to Australia requires a quarantine import permit and/or treatment or if there are any other quarantine prerequisites. There are currently a number of cases for onion plants listed on ICON (see Table 12). For export conditions see the Manual of Importing Country Requirements (MICoR) database at **www.daff.gov.au/micor/plants**.

The Australian Government is responsible for the inspection of machinery and equipment being imported into Australia. Any machinery or equipment being imported into Australia must meet quarantine requirements. If there is any uncertainty, contact DAFF on (02) 6272 3933 or 1800 020 504, or visit the website at **www.daff.gov.au/aqis**.

The World Trade Organisation (WTO) Sanitary and Phytosanitary Agreement (SPS Agreement) facilitates international trade while providing a framework to protect the human, animal and plant health of WTO members. SPS measures put in place must minimise negative effects on trade while meeting an importing country's appropriate level of protection. For plant products these measures are delivered through the IPPC standard setting organisations and collaboration with portfolio industries and exporters. For more information on the IPPC visit **www.ippc.int**.

Table 12. Import condition summary for onion listed in ICON (as at September 2012)³⁹

Commodity	End use	Import status	Import permit	Additional comments
Onions (<i>Allium cepa</i> ⁴⁰)	Nursery stock ⁴¹	Prohibited ⁴²		Condition for import from all countries.
Onions - Fresh	Human consumption	Permitted ⁴³	Required	Condition for import from the Netherlands only. Phytosanitary certificate required for each consignment.
Onions - Fresh	Human consumption	Permitted ⁴⁴	Required	Condition for import from New Zealand only. Phytosanitary certificate required for each consignment.
Onions - Fresh	Human consumption	Permitted ⁴⁵	Required	Condition for import from the United States of America only. Phytosanitary certificate required for each consignment.
Onions - Fresh - Processed	Human consumption	Permitted	Required	Condition for import from the People's Republic of China only. Phytosanitary certificate required for each consignment.
Onions - Fresh for processing	Processing	Permitted	Required	Condition for import from all countries. Phytosanitary certificate required for each consignment.
Onions - Frozen	Human consumption	Permitted	Not required	Condition for import from all countries. Documentary evidence verifying the freezing process (e.g. Freezing Declaration) required for each consignment.

³⁹ This is a summary only and should not be used as a substitute for consulting the ICON database (www.aqis.gov.au/icon32/asp/ex_querycontent.asp) or DAFF directly to confirm the details of import conditions and any recent changes

⁴⁰ Refer to ICON for complete list of prohibited species

⁴¹ Nursery stock is defined as all propagatable plant materials, including but not limited to bulbs, corms, cuttings, roots, tubers, rhizomes, stems and tissue cultures

⁴² Currently prohibited entry into Australia due to insufficient information available on risk status

⁴³ Entry only permitted from IJsselmeerpolders, Netherlands

⁴⁴ Entry only permitted from certain districts of New Zealand. Refer to ICON for further details.

⁴⁵ Entry only permitted from certain counties in the states of California and Idaho, USA

State and regional level – movement restrictions

Responsibility > state/territory government

The ability to control movement of materials that can carry and spread onion pests is of high importance. Each state has quarantine legislation in place to control the importation of onion material interstate and intrastate, and to manage agreed pests if an incursion occurs (refer to Table 13). Further regulations have been put in place in response to specific pest threats and these are regularly reviewed and updated by state/territory authorities and the Domestic Quarantine and Market Access Working Group (DQMAWG).

Moving plant material between states/territories generally requires permits from the appropriate authority, depending on the plant species and which territory/state the material is being transferred to/from. Moving plant material intrastate may also require a permit from the appropriate authority. Information on pre-importation inspection, certification and treatments and/or certification requirements for movement of onions can be obtained by contacting your local state or territory agriculture agency directly (see Table 13), or through contacts listed on the DQMAWG website www.domesticquarantine.org.au/go/dqmawg. In addition, the Quarantine Domestic Freecall telephone number 1800 084 881 can be used throughout Australia for information regarding the import requirements for the various states.

The movement of farm vehicles and equipment between states is also restricted because of the high risk of inadvertently spreading pests. Each state has quarantine legislation in place governing the movement of machinery, equipment and other potential sources of pest contamination. Information on farm vehicle and equipment movement restrictions can be found on page 69. Further information can be obtained by contacting your local state/territory department of agriculture (Table 13).

Table 13. Interstate and interregional movement of plant products – legislation, quarantine manuals and contact numbers

State	Administering authority	Legislation	Links to quarantine manual ⁴⁶	Phone
ACT	Environment ACT www.environment.act.gov.au	<i>Plant Disease Act 2002</i> <i>Pest Plants and Animals Act 2005</i>	See NSW conditions	13 22 81
NSW	Department of Primary Industries www.dpi.nsw.gov.au	<i>Plant Diseases Act 1924</i> <i>Plant Diseases Regulation 2008</i> <i>Noxious Weeds Act 1993</i> <i>Noxious Weeds Regulation 2008</i>	www.dpi.nsw.gov.au/aboutus/about/legislation-acts/plant-diseases	02 6391 3100
NT	Department of Primary Industry and Fisheries www.nt.gov.au/d/Primary_Industry	<i>Plant Health Act 2008</i> <i>Plant Health Regulations 2011</i>	www.nt.gov.au/d/Primary_Industry/index.cfm?newscat1=&newscat2=&header=NT%20Quarantine	08 8999 5511
Qld	Biosecurity Queensland, a part of the Department of Agriculture, Fisheries and Forestry, Queensland www.daff.qld.gov.au/4790.htm	<i>Plant Protection Act 1989</i> <i>Plant Protection Regulation 2002</i>	www.daff.qld.gov.au/26_114.htm	13 25 23
SA	Primary Industries and Regions SA www.pir.sa.gov.au	<i>Plant Health Act 2009</i> <i>Plant Health Regulations 2009</i>	www.pir.sa.gov.au/biosecuritysa/planthealth/legislation/plant_quarantine_standard	08 8207 7820
Tas	Department of Primary Industries, Parks, Water and Environment www.dpipwe.tas.gov.au	<i>Plant Quarantine Act 1997</i> <i>Weed Management Act 1999</i>	www.dpipwe.tas.gov.au/inter.nsf/Topics/LBUN-7YQVX9?open	1300 368 550
Vic	Department of Primary Industries www.dpi.vic.gov.au	<i>Plant Biosecurity Act 2010</i> <i>Plant Health and Plant Products Regulations 2006</i>	http://dpi.vic.gov.au/agriculture/horticulture/moving-plants-products/About-Plant-Quarantine-Manual	13 61 86
WA	Department of Agriculture and Food www.agric.wa.gov.au	<i>Plant Diseases Act 1914</i> <i>Plant Diseases Regulations 1989</i> <i>Biosecurity and Agricultural Management Act 2007</i> ⁴⁷	www.agric.wa.gov.au/PC_92916.html	08 9368 3333

⁴⁶ If the link does not work, the relevant documents can be found by going to the department home page and checking the quarantine section of each website

⁴⁷ Will replace *Plant Diseases Act 1914* and *Plant Diseases Regulations 1989*. Implementation soon to be underway.

New South Wales

New South Wales (NSW) currently has in place specific regulations relating to the movement of onions into the state. These regulations have been put in place to prevent the introduction of the disease Onion smut caused by the pathogen *Urocystis cepulae*. All plants and plant parts of the genus *Allium* are prohibited entry into NSW. NSW also has restrictions on the entry of any plants which have originated from, or moved through, the northern parts of Queensland or the Northern Territory (NT) in order to prevent the import into the state of the pest spiralling whitefly (*Aleurodicus dispersus*) which has a wide host range. Further information on importation may be obtained from DPI NSW Regulatory Services by phone 1800 084 811.

Northern Territory

Administrative authority for regional quarantine in the NT is vested in the Department of Primary Industry and Fisheries (DPIF) under the *Plant Health Act 2008* and *Plant Health Regulations 2011*. The Act enables notifiable pests to be gazetted, quarantine areas to be declared and inspectors appointed to carry out wide ranging control and/or eradication measures. Plant import requirements for particular pests, plants or plant related materials are identified in the Regulations.

To restrict entry of the pest *Frankliniella occidentalis* (Western flower thrips) into NT, there are currently restrictions on the import of *Allium* spp. plant material. Onion plants containing foliage must not be introduced into NT if the plant originates from any part of the country, state or territory that was infested with Western flower thrips at any time within two years prior to transportation, unless accompanied by a government certificate or assurance certificate. Further information on NT import requirements and treatments can be obtained by contacting NT Quarantine on (08) 89992118 or email quarantine@nt.gov.au.

For more information refer to the DPIF website (www.nt.gov.au/d).

Queensland

Information on specific pre-importation inspection, treatments and/or certification requirements for movement of any fruit or plant material into Queensland, as well as maps of pest quarantine areas, may be obtained from the Biosecurity Queensland part of the DAFF Queensland website (www.daff.qld.gov.au/26_114.htm). Further details can be obtained from the DAFF Queensland Customer Service Centre (13 25 23 within Queensland, or phone 07 3404 6999 or fax 07 3404 6900 interstate).

South Australia

Information on pre-importation inspection, certification and treatments and/or certification requirements for movement of fruit or plant material in South Australia (SA) may be obtained from Biosecurity SA - Plant Health by phone (08) 8207 7820 or fax (08) 8207 7844. Further information can be found at www.pir.sa.gov.au/biosecuritysa/planthealth.

Primary Industries and Regions South Australia (PIRSA) have strict regulations and requirements regarding the entry of plant material (including onion plants) into the State of SA. Onion plants and plant material are not permitted to enter SA unless accompanied by a Plant Health Certificate or Plant Health Assurance Certificate issued by a departmental inspector or accredited business in the State of origin. The original certificate must accompany plants during transport. A transport manifest, detailing all plant consignments, must be sent to PIRSA (fax 08 8124 1467 or email to Pirsa.PlantHealthManifest@sa.gov.au) prior to plants arriving in SA. For further information on import conditions consult the Plant Quarantine Standard (www.pir.sa.gov.au/biosecuritysa/planthealth/legislation).

Tasmania

General and specific import conditions apply to the importation of plant material into Tasmania to prevent the introduction of pests and diseases into the State. Import of vegetables and plants (including onions) into Tasmania must meet State import requirements and be accompanied by a Notice of Intention to import. For further information on import conditions consult the Department of Primary Industries, Parks, Water and Environment (DPIPWE) Biosecurity website (www.dpipwe.tas.gov.au/biosecurity).

Victoria

The movement into Victoria of plants and plant products may be subject to a prohibition, or to one or more conditions which may include chemical treatments. These prohibitions and conditions are described in the Plant Quarantine Manual (see link in Table 13). In relation to onions, any plant grown in a place covered by an Area Freedom Certificate declaring area freedom from Onion smut (*Urocystis cepulae*) may enter Victoria without restriction, otherwise the entry or importation into Victoria of any plant, bulb or seed of the genus *Allium* (excluding plants in tissue culture) is prohibited. Plants must be accompanied by a Plant Health Certificate, Plant Health Assurance Certificate or Plant Health Declaration. Further information on pre-importation inspection, certification and treatment requirements may be obtained from the DPI Customer Service Centre by phone 136 186.

Western Australia

The lead agency for agricultural biosecurity in Western Australia (WA) is the Department of Agriculture and Food (DAFWA). WA is free of a number of pests that are present elsewhere in

Australia and maintain freedom from several pests. All plant material of any species entering WA is required to pass through quarantine.

To prevent the entry into WA of Onion rust (*Puccinia porri*), White rot (*Sclerotium cepivorum*) and Onion smut (*Urocystis cepulae*), onion plants and plant products are required to be certified as inspected and found to be free from these diseases. Onion plants and plant products originating from SA are also required to be certified as free from the disease Onion Smut.

For further information on pre-importation inspection, certification and treatment requirements contact Quarantine WA on (08) 9334 1800 or fax (08) 9334 1880.

Farm level – exclusion activities

Responsibility > state/territory government, industry/growers and nursery operators

A significant risk of spreading pests onto farms arises when propagation material, people, machinery and equipment move from property to property and from region to region. It is the responsibility of the industry and the owner/manager of each property to ensure these risks are minimised.

It is in the interests of industry to encourage and monitor the management of risk at the farm level, as this will reduce the probability of an incursion and increase the probability of early detection. This should in turn reduce the likelihood of a costly incident response, thereby reducing costs to industry, government and the community.

One major way this can be achieved is through management of industry biosecurity at the farm level using exclusion practices. Further detail on potential strategies is included in the Farm Biosecurity section (page 60). This could be used as a reference source for developing extension material for promoting good farm hygiene.

Nurseries and retailers – ‘hitch-hikers’

Responsibility > state/territory government, industry/growers and nursery operators

It is vital to ensure that pests are not introduced into new areas as ‘hitch-hikers’ on nursery material. This is particularly relevant for onion material used for seed production which can be distributed widely between regions and states. Produce transporters and purchasers for retail outlets (e.g. Woolworths, Bunnings, Coles) must obtain advice from state quarantine

authorities before moving onion material between regions or interstate. Advice in all states is available free of charge from the Domestic Quarantine website (www.dqmwg.org.au).

Nursery stock should be labelled in a manner that allows the source to be identified for trace-back purposes. Where pest or disease symptoms are found on nursery stock it is important to identify the causal agent. New or unfamiliar pests should be reported for identification (see Reporting Suspect Pests section on page 76).

Good nursery hygiene practices help to prevent pest spread. The Nursery and Garden Industry Australia (NGIA) Nursery Industry Accreditation Scheme (NIASA) and similar schemes provide guidelines for nursery owners and growing media suppliers for maintaining hygiene standards. Examples of relevant nursery hygiene practices include training of staff to recognise pest and disease symptoms, controlling pests in nursery crops, and sterilisation of growing media and equipment. Information on NIASA can be obtained from the NGIA (www.ngia.com.au) or the Nursery and Garden industry office in your state.

Surveillance

Surveys enhance prospects for early detection, minimise costs of eradication and are necessary to meet the treaty obligations of the WTO Sanitary and Phytosanitary Agreement (SPS) with respect to the area freedom status of Australia's states, territories and regions.

The SPS agreement gives WTO members the right to impose SPS measures to protect human, animal and plant life health provided such measures do not serve as technical barriers to trade. In other words, for countries (such as Australia) that have signed the SPS Agreement, imports of food, including fresh fruit and vegetables, can only be restricted on proper, science-based quarantine grounds. Where quarantine conditions are imposed, these will be the least trade restrictive measures available that meet Australia's appropriate level of quarantine protection. The agreement also stipulates that claims of area freedom must be supported by appropriate information, including evidence from surveillance and monitoring activities. This is termed "evidence of absence" data and is used to provide support that we have actively looked for pests and not found them.

There are currently no international standards for structured pest surveys. Their planning and implementation depends on the risk involved, the resources available, and the requirements of trading partners (particularly when Australia wishes to access overseas markets). The

intensity and timing of surveys also depend on the spread characteristics of the pest and the costs of eradication.

Early detection of an exotic incursion can significantly increase the likelihood of a successful eradication campaign, and reduce the associated costs. Effective surveillance plays a critical role in working toward this goal. Surveillance can be either targeted toward specific pests, or general in nature. General non-targeted surveillance is based on recognising normal versus suspect plant material. Targeted surveillance is important for establishing whether particular pests are present in each state or region, and if so, where these occur.

Industry personnel can provide very effective general surveillance as part of their normal management procedures (i.e. 'passive surveillance'), provided individuals are aware of what to look for and of reporting procedures. Consultants and crop scouts can provide valuable information as they are regularly in the field, and hence can observe any unusual pest activity or symptoms on plants.

National surveillance programs

Responsibility > Australian Government, industry (national associations)

DAFF maintains barrier quarantine services at all international ports and in the Torres Strait region. DAFF also surveys the northern coast of Australia, offshore islands and neighbouring countries for exotic pests that may have reached the country through other channels (e.g. illegal vessel landings in remote areas, bird migrations, wind currents) as part of the Northern Australia Quarantine Strategy (NAQS).

State surveillance programs

Responsibility > state/territory governments, industry/growers and nursery operators

State level surveillance depends on the participation of all stakeholder groups, particularly state/territory agriculture departments, industry representative groups, agri-business and growers.

The state agriculture department can provide:

- planning and auditing surveillance systems
- coordinating surveillance activities with those of industry and interstate groups
- providing diagnostic services
- providing field diagnosticians for special field surveillance

- carrying out surveillance on non-commercial sites
- liaising with industry members
- developing communication, training and extension strategies with industry
- carrying out training
- reporting to all interested parties (DAFF, national bodies, trading partners and industry).

Various pest surveillance programs are managed by DAFF and the state/territory agriculture departments. Many state departments run general surveillance programs whereby suspect samples can be forwarded and diagnosed for the presence of exotic pests free of charge. Official surveillance programs that target pests of the onion industry (exotic or those under official control in a region or state) are shown in Table 14.

Table 14. Official surveillance programs that target pests of the onion industry⁴⁸

Surveillance program	Pests targeted	State/region	Deliverer
NAQS Pest and Disease Survey	American leafminer (<i>Liriomyza sativae</i>), Pea leafminer (<i>Liriomyza huidobrensis</i>)	Australia's northern coastline from Cairns to Broome (Qld, NT and WA), including the Torres Strait – natural environments, agricultural and community regions, ports of entry	NAQS
Onion smut	Onion smut (<i>Urocystis cepulae</i>)	Adelaide Hills, Northern Adelaide, south east Murraylands, Mallee – agricultural regions	PIRSA
Thrips surveillance	Melon thrips (<i>Thrips palmi</i>), Western flower thrips (<i>Frankliniella occidentalis</i>)	Darwin, Palmerston, Darwin rural area, Adelaide River	DPIF
Western flower thrips	Western flower thrips (<i>Frankliniella occidentalis</i>)	Exporters premises, nurseries and flower growers statewide	PIRSA

For the onion industry, there is currently a need to monitor pests and diseases of onion bulbs dumped by importers and distributors, however at the present time there is no surveillance program targeting this.

⁴⁸ Information presented has been taken from the National Plant Health Status Report 2011 and confirmed or updated in November 2011 by the Subcommittee on National Plant Health Surveillance (subcommittee of the Plant Health Committee)

Farm and nursery surveillance activities

Responsibility > industry/growers and nursery operators

Farm level surveillance involves the participation and interaction of growers, agribusiness and industry representative groups. Examples of the surveillance activities that can be carried out by each of these groups are outlined in Figure 6. Conducting regular surveys of farms and nurseries provides the best chance of spotting new pests early and implementing eradication or management responses.

Nurseries operating to NIASA guidelines are required to monitor pest activity in the nursery, effectively control pests, and keep a pest management record diary.

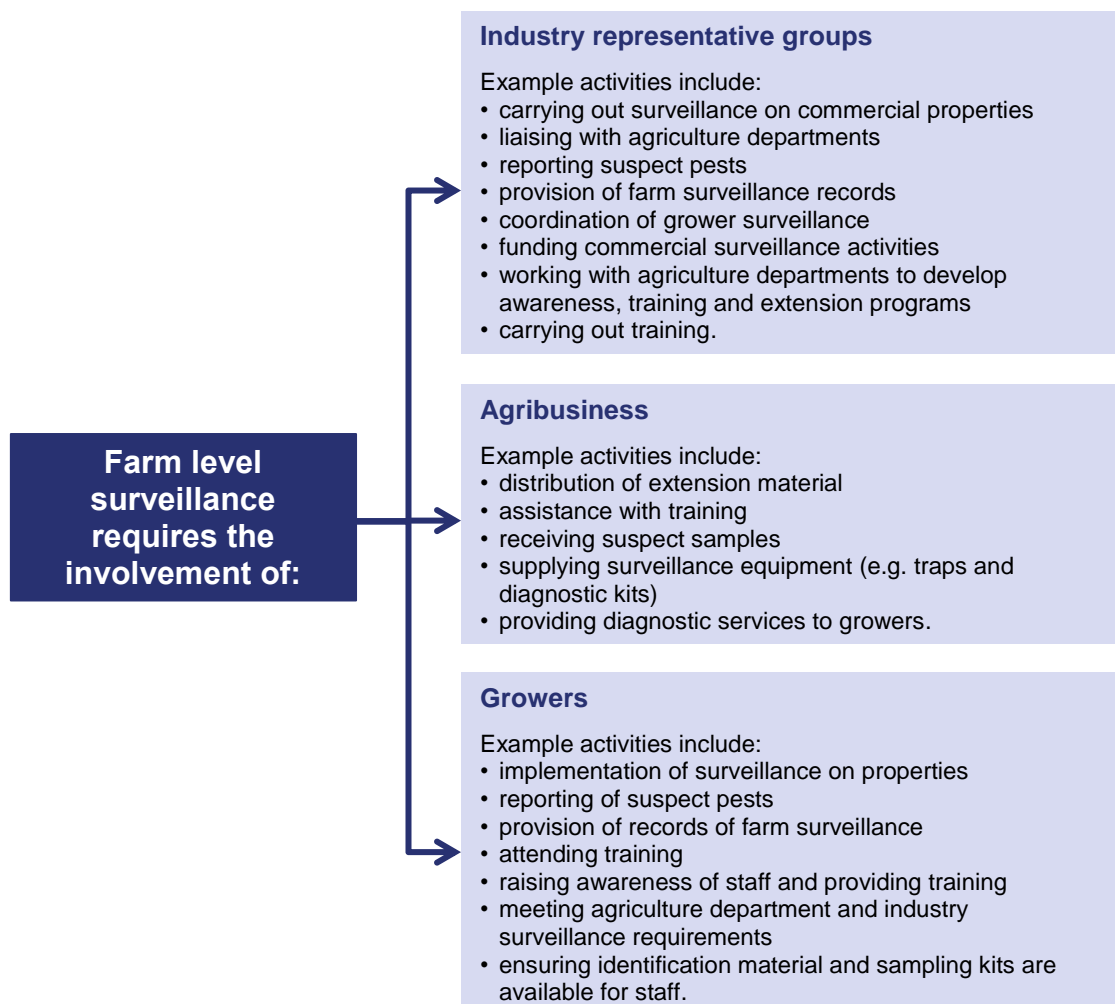


Figure 6. Examples of farm level surveillance activities

Training

A key component of emergency plant pest preparedness is ensuring suitable and effective training for people involved in responding to emergency plant pest incursions. Effective training is the responsibility of both government and industry.

PHA's national training program for EPP preparedness

The PHA national training program is a program for industry and government personnel who have roles and responsibilities as members of the various committees under PLANTPLAN, the national emergency response plan for the plant industries. This includes training for Industry Liaison Officers and Industry Liaison Coordinators.

Training programs will help ensure personnel involved in responding to emergency plant pests are proficient and have the skills required to effectively perform their duties.

Additionally, training material on biosecurity awareness has been developed that is available to all PHA members to assist raising awareness of biosecurity issues (Table 15). This is targeted at industry leaders, agricultural consultants/extension officers, growers and the general community.

Table 15. Training materials from PHA's National Training Program for EPP preparedness⁴⁹

Training/briefing material available
Consultative Committee on Emergency Plant Pests
Domestic Quarantine and Market Access Working Group
National Management Group
Industry Liaison Officer/Coordinator
PLANTPLAN incursion response roles - various
Biosecurity awareness (industry leaders, consultants/extension officers, growers, community)
EPPRD awareness training
PHA Biosecurity On-line Training (BOLT)

⁴⁹ Refer to the PHA website for the most up-to-date information, or contact PHA for further details

Awareness

Early reporting enhances the chance of effective control and eradication. Awareness activities (such as the postcard shown in Figure 7) raise the profile of biosecurity and exotic pest threats to the onion industry, which increases the chance of early detection and reporting of suspect pests. Responsibility for awareness material lies with industry and government, with assistance from PHA as appropriate. Any unusual plant pest should be reported immediately to the relevant state/territory agriculture agency.



Figure 7. Postcard from Plant Health Australia's Plant Health Awareness campaign

High priority plant pest threat-related documents

Pests listed in Table 5 have been identified as high priority threats to the onion industry by members of the IBG. They have been assessed as having high entry, establishment and spread potentials and/or a high economic impact. This list should provide the basis for the development of awareness material for the industry.

Further information on high priority pests

In addition to the fact sheets listed in Table 25, the websites listed below (Table 16) contain information on pests across most plant industries, including the onion industry.

Table 16. Sources of information on high priority pest threats for the onion industry

Source	Website
Department of Agriculture, Forestry and Fisheries (DAFF)	www.daff.gov.au
Pest and Disease Image Library (PaDIL)	www.padil.gov.au
DAFF Queensland exotic plant pests and disease list	www.daff.qld.gov.au/26_6460.htm
University of California Statewide Integrated Pest Management (IPM) Program	www.ipm.ucdavis.edu/EXOTIC/exoticpestsmenu.html
Secretariat of the Pacific Community (SPC)	www.spc.int/pacifly

Further information/relevant web sites

A range of government and grower organisation details and websites are provided below (Table 17) for persons seeking further information on onion industry biosecurity.

Table 17. *Relevant sources of further biosecurity information for the onion industry*

Agency	Website/email	Phone	Address
National			
Onions Australia	www.onionsaustralia.org.au	(08) 8725 8862	105A Commercial Street East Mount Gambier East, SA 5290
Australian Government Department of Agriculture, Fisheries and Forestry	www.daff.gov.au www.daff.gov.au/aqis	(02) 6272 3933	GPO Box 858 Canberra, ACT 2601
Plant Health Australia	www.planthealthaustralia.com.au biosecurity@phau.com.au	(02) 6215 7700	Level 1, 1 Phipps Cl Deakin, ACT 2600
New South Wales			
Department of Primary Industries	www.dpi.nsw.gov.au	1800 808 095	Locked Bag 21 Orange NSW 2800
Queensland			
Biosecurity Queensland, a part of the Department of Agriculture, Fisheries and Forestry, Queensland	www.daff.qld.gov.au callweb@daff.qld.gov.au	13 25 23	80 Ann Street Brisbane, QLD 4000
Northern Territory			
Department of Primary Industry and Fisheries	www.nt.gov.au/d/Primary_Industry info.DPIF@nt.gov.au	(08) 8999 5511	Berrimah Farm, Makagon Road Berrimah, NT 0828

Agency	Website/email	Phone	Address
South Australia			
Primary Industries and Regions SA	www.pir.sa.gov.au www.pir.sa.gov/customer_enquiry_form	(08) 8226 0222	GPO Box 1671 Adelaide SA 5001
Biosecurity SA-Plant Health	www.pir.sa.gov.au/biosecuritysa/planthealth	(08) 8207 7820	33 Flemington Street Glenside SA 5065
South Australian Research and Development Institute	www.sardi.sa.gov.au sardi@sa.gov.au	(08) 8303 9400	2b Hartley Grove Urrbrae SA 5064
Tasmania			
Department of Primary Industries, Parks, Water and Environment	www.dpipwe.tas.gov.au BPI.Enquiries@dpipwe.tas.gov.au	1300 368 550	GPO Box 44, Hobart, TAS 7001
Victoria			
Department of Primary Industries	www.dpi.vic.gov.au	1800 084 881	Plant Biosecurity and Product Integrity, Private bag 15, Ferntree Gully Delivery Centre, Vic 3156
Western Australia			
Department of Agriculture and Food	www.agric.wa.gov.au enquiries@agric.wa.gov.au	(08) 9368 3333	DAFWA 3 Baron-Hay Court South Perth WA 6151

Farm biosecurity

Introduction and outline

Plant pests can have a major impact on production if not managed effectively. This includes pests already present in Australia and a number of serious pests of onions that Australia does not have.

Farm biosecurity measures can be used to minimise the spread of such pests before their presence is known or after they are identified, and therefore can greatly increase the likelihood that they could be eradicated. This section of the document outlines farm biosecurity and hygiene measures to help reduce the impact of pests on the industry.

The biosecurity and hygiene measures outlined here can be considered as options for each farm's risk management. Many of these measures can be adopted in a way that suits a given farm so that each can have an appropriate level of biosecurity.

Farm biosecurity reporting procedures and hygiene strategies to reduce threats covered in this document are:

- managing the movements of vehicles and farm equipment
- movement of people
- use of warning and information signs
- visiting overseas farms/orchards – what to watch out for when you return
- quality and hygiene Best Management Practices
- use of high health status seed and bulb stock
- chemical and biological control measures
- control of vectors
- destruction of crop residues and
- farm biosecurity checklist.

Selection and preparation of appropriate plant material

Bottom line Using high health seed and bulb stock reduces the pest load and improves farm biosecurity

Responsibility > Australian Government (national border control), state/territory government (intra- and interstate border controls), industry/growers and nursery operators

Onion plants and propagation material should not be distributed without screening for pests. Seed is the primary source for propagation of onion crops within Australia, representing at least 95% of all commercial onions plantings. One of the main causes of disease in crops is the sowing of contaminated seed. *Botrytis allii* is an example of a seed borne disease in Australia which can have significant impacts on onion crops. Seed-borne diseases can be avoided by sowing disease-free seed harvested from healthy plants. Planting seed that has been certified as being free of pests provides a useful safeguard for growers. The value of certified planting material is enhanced if the parent crops have been grown in pest free areas. If certified sources of propagation material are not available, it is important to obtain material from a reputable source. Other prevention measures such as fungicide treatments can further reduce the risk. Bulbs used for onion seed production should also be disease-free and harvested from healthy plants. Contact Onions Australia (Table 23) for further advice on selection and preparation of onion propagation material.

Selecting appropriate cultivars

Bottom line Growers should investigate all variety and cultivar options available at the time of planting or replanting

Responsibility > state and territory governments, industry/growers and nursery operators

Cultivar selection is a very important aspect of farm production. Factors that need to be taken into account include the end use for the bulbs i.e. fresh market or export, suitability to the climate of the specific region and potentially tolerance or resistance to certain pests. As these factors are so variable and situation specific, it is advisable that the grower investigate all variety and cultivar options available at the time of planting or replanting.

Chemical control measures

Bottom line Appropriate training and advice on safe chemical use should be obtained prior to chemical control of pests

Responsibility > industry, drawing on advice from government and non-government research agencies

Chemical control programs may be required during crop growth to control pests or may be required around the farm to control weeds or volunteers that may harbour pests. A planned and effective monitoring and pest management program, prepared in consultation with an Integrated Pest Management (IPM) consultant and/or your local Department of Primary Industries officers will minimise the impact of pests on your crop.

Farmers, their staff and contractors undertaking chemical control measures are required by law to complete certain training in an accredited course, depending upon the state in question.

The Australian Pesticides and Veterinary Medicines Authority (APVMA) is the national authority responsible for registration and deregistration of chemicals and can be contacted by phone on (02) 6210 4701. The APVMA Permit Section deals specifically with emergency registrations for chemicals. Further information can be obtained from the APVMA web site (www.apvma.gov.au).

Control of vectors

Bottom line Vectors, such as insects, people and machinery can increase the spread of some pathogens, especially viruses and bacteria

Responsibility > industry/growers and nursery operators, drawing on advice from government and non-government research agencies

Many viruses and some bacteria require a vector to provide a means of dispersal. Biological vectors can include invertebrates such as insects and mites, nematodes, fungi, birds and people. Non-biological vectors such as machinery/equipment and clothing can also serve as vectors of plant pathogens. For example, fungal diseases of onion (e.g. White rot and Onion smut) can be easily transmitted through sclerotia adhering to clothing or machinery/equipment. The activity and mobility of the vector determines the rate and distance of dispersal. Some insects may not be vectors but can increase the severity or facilitate the spread of pathogens.

Inspection and cleaning of vehicles, machinery and equipment (such as onion harvesters, tractors used for planting and spraying, vehicles transporting inputs and harvested produce) helps to prevent pest spread, as does cleaning of footwear and restricting unnecessary people movements around the farm. Consideration should also be given to the control of known vectors of plant pathogens when new disease incursions are likely. In these cases, management of the vector will enable management of the pathogen.

The use of chemicals to control vectors can have a number of potentially adverse effects on the production and marketing of onions including residues on produce that may limit market access, and chemical resistance that may develop in target pests.

IPM practices, such as the use of natural enemies and pheromone traps, can be effective methods of controlling vectors and managing the threat of insecticide resistance. Advice on IPM and control of onion pests can be obtained from your local state/territory agriculture department.

Control of alternative hosts

Bottom line Pest management protocols can be enhanced through the control of alternative hosts

Responsibility > industry/growers, drawing on advice from government and non-government research agencies

Control of Weeds

Weed species are significant biosecurity problems in their own right as well as acting as alternative hosts of some agricultural or horticultural pests. Where this is so, weed control practices can significantly contribute to limiting the survival of pests and reducing the potential for incursions. Australia has a number of endemic and naturalised species of *Alliaceae* that could potentially host a variety of onion pests. Listed below (Table 18) are some of the common weed species found in Australia:

Table 18. Common weed species of *Alliaceae* found in Australia

Name	Description	Distribution
<i>Agapanthus praecox</i> subsp. <i>orientalis</i>	A rhizomatous, perennial herb with purple flowers in October.	WA, SA, NSW, Vic
<i>Allium ampeloprasum</i> (Great head garlic)	A bulbaceous, perennial herb, which grows up to 1.8 m high, with purple, pink, white, or red flowers in December.	WA, SA, NSW, Vic, Tas
<i>Allium neapolitanum</i> (Naples onion)	A bulbaceous, perennial herb, 0.15–0.3 m high, with white flowers in August to September.	WA, SA, NSW, Vic, Tas

Name	Description	Distribution
<i>Allium oleraceum</i>	A bulbaceous, perennial herb growing up to 0.6 m, with white to pink flowers in July and August.	NSW, Vic, Tas, SA
<i>Allium paniculatum</i> (Mediterranean onion)	A bulbaceous, perennial herb growing up to 0.8 m high with white to purplish-pink flowers in November.	SA, Vic
<i>Allium porrum</i> L.	A bulbaceous, perennial herb growing up to 1 m, with white, pink or red flowers from October to December.	SA, Vic, WA
<i>Allium schoenoprasum</i> (Chives)	A bulbaceous, perennial herb which grows up to 0.4 m and produces little purple or lilac flowers in rounded umbels.	Widespread
<i>Allium scorodoprasum</i> (Sand leek)	A bulbaceous, perennial herb which grows up to 0.8 m high with dark reddish-purple flowers from October through to November.	SA
<i>Allium triquetrum</i> L. (Three-cornered garlic)	A bulbaceous, perennial herb growing up to 0.3 m high, with white flowers from August to October.	WA, Vic, SA, NSW
<i>Allium vineale</i> (Crow garlic)	A bulbaceous, perennial herb growing up to 1 m high, with white to pink flowers in summer.	SA, Vic, WA, Tas, NSW
<i>Ipheion uniflorum</i> (Spring star flower)	A bulbaceous, perennial herb, which grows to 0.3 m high. It produces white – blue flowers from September to November.	WA, Vic, Tas, NSW
<i>Nothoscordum borbonicum</i> (Honeybells)	A bulbaceous, perennial herb, which grows to 0.6 m high. White flowers from September to December.	NSW, Vic
<i>Nothoscordum inodorum</i> (Onion weed, Wild onion)	Erect herb with underground bulb producing several smaller bulbs. Leaves linear, arising from plant base. Flowers white to faint pink, borne on short pedicels in dense clusters.	Widespread

Some alternative hosts may not be weeds. Details of any alternative hosts will be included in pest specific contingency plans for high priority onion pests (see Contingency Planning section of this plan on page 79).

Control of ornamentals

Ornamental plants that are present around the cropping areas are of concern as they can harbour disease inoculum and insect pests, which can become established in subsequent crops. Strategies for the containment or destruction of ornamentals should be adopted depending on the pest involved. Specific advice should be sought from the relevant state/territory agriculture department.

Neglected farms and volunteer plants

Bottom line Reduce the ability of pests to spread and establish through the removal of neglected plants

Responsibility > government, industry/growers

Neglected farms and volunteer plants potentially pose a high biosecurity risk to the onion industry, as they may allow pests to multiply, become established and spread.

Control of derelict farms and feral plants should be proactive to reduce the risk of establishment and spread if an incursion does occur. If no action is taken with regard to the removal of these plants, the task will get progressively larger until it reaches a level of impossibility.

In general the problem is caused by some members of the community and not by industry. The industry is strongly supportive of the need for this host burden to be removed.

Suspected neglected or volunteer plants should be reported to one of the authorities listed in Table 19. After reporting, appropriate steps may be taken by the relevant authority to ensure the neglected plants do not carry pests or pose a risk to nearby or adjacent farms. Table 19 also provides a summary of the actions that may be carried out in each state under relevant legislation.

Table 19. Authorities responsible for dealing with neglected, feral or volunteer plants

State	Authority	Legislation	Actions enabled
NSW	DPI	<i>Plant Diseases Act 1924</i>	The <i>Plant Diseases Act 1924</i> provides powers to quarantine and requires owners to treat plants harbouring pests or diseases. The Act gives officers the power to destroy plants within neglected or abandoned orchards or nurseries, if they are likely to harbour or spread diseases or pests.
NT	DPIF	<i>Plant Health Act 2008</i> <i>Plant Health Regulations 2011</i>	There is no provision for control of neglected farms unless a declared pest or disease has been detected on the farm or in the near vicinity and specified action or removal is required by a notice from the Chief Inspector, for plants to be destroyed. Costs incurred may be recovered if conducted by DPIF.
Qld	DAFF Qld	<i>Plant Protection Act 1989</i> <i>Plant Protection Regulation 2002</i>	The Department of Agriculture, Fisheries and Forestry, Queensland has no particular powers on neglected farms, unless they are infested with a declared pest.

State	Authority	Legislation	Actions enabled
SA	PIRSA	<i>Plant Health Act 2009</i>	There is no provision under SA's <i>Plant Health Act 2009</i> for control of neglected farms unless a declared pest or disease has been detected in the farm or in the near vicinity and specified action or removal is required by Ministerial Notice.
Tas	DPIPWE	<i>Plant Quarantine Act 1997</i>	Though there are no specific legislative provisions to deal with neglected farms. Quarantine Tasmania advise that neglected farms should be reported to the Department of Primary Industries, Parks, Water and Environment, or the State Grower Industry representative. Neglected farms may be removed if they present a risk to adjacent farms by harbouring populations of pests or diseases on the "Annual List of List A and List B Pests and Diseases". Copies of these lists are available on request from Quarantine Services, Tasmania.
Vic	DPI	<i>Plant Biosecurity Act 2010</i>	Under the <i>Plant Biosecurity Act 2010</i> , if an inspector knows or reasonably suspects that any plant or plant product is affected by any plant pest or disease on any land, and he or she reports it to the Secretary, a notice may be issued requiring that the owner or occupier control, eradicate or destroy the affected plants or plant produce.
WA	DAFWA	<i>Plant Diseases Act 1914</i> <i>Biosecurity and Agricultural Management Act 2007</i> ⁵⁰	Neglected production plants in Western Australia can be removed or destroyed if required, under order by the Minister.

Growers wishing to remain anonymous when reporting suspected neglected or feral crops may report through their local or national grower association (for contact details refer to Table 23, page 83).

Post-harvest handling and produce transport procedures

Bottom line Pest spread off-property can be reduced through providing appropriate wash-down facilities for machinery and equipment and checking for pest activity in the farm. Produce identification systems provide a mechanism for tracing pests following an incursion.

Responsibility > industry/growers, drawing on advice from government and non-government research agencies

Vehicles that are used to harvest or to transport onions, particularly if moving between farms, should be cleaned to remove soil and plant matter. This will help to minimise the risk of pest

⁵⁰ Will replace *Plant Diseases Act 1914*. Implementation soon to be underway.

spread. For this purpose, all farms should have access to a high pressure wash down facility that is associated with a concrete or tarmac pad.

It is preferable that wash down facilities are located on the property, or failing this, close to the property. At a minimum wash down facilities should be located within the same region as the property. Detergent based disinfectants should be considered. Water draining from the wash down facility should not be directed back into fields or the farm irrigation water supply.

Growers should maintain effective pest monitoring and management programs. This includes keeping records of pest incursions and the control measures used. Clients receiving the produce should be informed of the produce source and whether the material has come from an area experiencing a pest incursion.

Restrictions may be placed on the introduction or movement of onions by individual states or territories, for example, specifying the use of certain transport routes, container types or consignment management procedures. If proposing to move onions within or between quarantine areas, or between states, transporters should first check with state authorities to find out which regulations apply (see Barrier Quarantine section, page 43).

Identification and tracing system will assist in tracing produce consignments to their source if they are found to be contaminated with an exotic pest. Consignments should be clearly marked with the grower's name or code, and a batch identification mark (date or other code). Growers should maintain a record of the source and destination of each batch, and identify separate growing areas on a property map.

Post-harvest handling and produce transport procedures that minimise the risk of pest movement should be developed further and promoted within the industry.

Up-to-date advice on movement restrictions must always be sought before moving onion plant material and products. This can be obtained from the Domestic Quarantine website (www.dqmag.org.au), or enquiries can be made directly to your local state or territory agriculture agency.

Use of warning and information signs

Bottom line Warning signs tell visitors to your property that you have biosecurity measures in place so as to minimise the spread of pests

Responsibility > industry/growers

Place warning and information signs on the entrances and gates of properties (where practicable) to help inform visitors of the biosecurity practices in place, and remind personnel that farm biosecurity is a priority. Signs should also include up-to-date contact details for people to gain further information. Visitors to the area may not be aware of relevant biosecurity protocols.

All people entering the property should have a clear view of any informative signs. Signs should contain simple messages (e.g. do not enter the property without prior approval, use wash down facilities for cleaning vehicles and machinery). An example biosecurity sign is shown in Figure 8.



Figure 8. Example biosecurity warning and information sign

Managing the movement of vehicles and farm equipment

Bottom line Vehicles and farm equipment can carry a range of pests, especially in attached soil or plant debris. Preventing spread of plant and soil debris, by washing down machinery or denying access to dirty machinery, can prevent pest introductions onto your property.

A high risk of spreading pests comes from movements of people, machinery and equipment between regions and farms. This risk can be reduced by ensuring plant material and soil that may harbour pests is not moved to other properties or regions.

This deals only with movements between farms and growing regions. For interstate or international movements of farm equipment and vehicles, contact your state/territory agriculture department (Table 13) or DAFF, respectively.

Movement of vehicles and equipment between farms and between regions can potentially spread pests. Vehicles (including cars and farm equipment such as harvest bins and tractors) can carry soil and soil-borne pathogens (especially when muddy) and plant debris may have weed seeds or may carry pests (including pathogens or insects).

While it is not always practical to stop these movements on and off your farm, a number of measures can be used to reduce spread of pests by this route. Possible strategies include:

- visually inspect machinery and equipment (e.g. harvest bins, trucks and any other equipment) for signs of soil or plant material before it comes onto the property
- clean soil, plant or other debris from equipment or vehicles (especially equipment used on crops directly) prior to entering the property and deny access to any equipment that does not meet your standards
- use high-pressure wash down facilities (ideally with a concrete or tarmac pad for cleaning vehicles and equipment), not allowing wash down runoff to enter the farm or irrigation sources and for hedging equipment, use bleach as well as high pressure water
- restrict movements of vehicles and people (where possible) during high-risk periods, including avoiding moving vehicles and machinery, particularly when roads are wet and muddy
- assign certain equipment (including clothing, tools and footwear) to be used in pest infected areas only, ensuring that the equipment used in infected properties or areas is not reused in clean areas – and *vice versa*
- provide a designated parking area at the front of the property
- transport visitors, contractors, employees and government officials using vehicles based permanently on the property

- cover harvested crops to prevent plant material from blowing off during transit to the packing house (loose onion leaf material can carry fungal sclerotia for example).

National controls

Responsibility > Australian Government

The Australian Government is responsible for the inspection of machinery and equipment being imported into Australia. Administrative authority for national quarantine is vested in DAFF under the *Quarantine Act 1908*. Any machinery or equipment being imported into Australia must meet quarantine requirements. If there is any uncertainty, contact DAFF on (02) 6272 3933 or 1800 020 504, or visit the website at www.daff.gov.au/aqis.

State controls

Responsibility > state/territory government

Each state has quarantine legislation in place governing the movement of machinery, equipment and other potential sources of pest contamination (Table 13). A summary of the movement restrictions can be found in Table 20 with additional information available in quarantine manuals (Table 13) and on the Domestic Quarantine website (www.dqmagw.org.au).

Table 20. State/territory restrictions on movement of machinery and equipment

State	Authority	Legislation	Control procedures
NSW	NSW DPI	<i>Plant Diseases Act 1924</i> <i>Noxious Weeds Act 1993</i> <i>Noxious Weeds Regulation 2008</i>	Restrictions apply to movement of machinery and equipment into NSW that may have come into contact with rice pests, Onion smut, Panama disease Tropical race 4, Red imported fire ants, Lupin anthracnose, Potato cyst nematode or Grapevine phylloxera. Requirements regarding the inspection and cleaning of machinery for weed seeds are covered by the <i>Noxious Weeds Act 1993</i> and <i>Noxious Weeds Regulation 2008</i> .
NT	DPIF	<i>Plant Health Act 2008</i> <i>Plant Health Regulations 2011</i>	A permit is required for the movement of agricultural machinery & equipment and mining and earthmoving machinery & equipment into the NT. Restrictions are in place to control movement of machinery, equipment and persons from gazetted quarantine areas. Contact NT Quarantine on (08) 8999 2118.
Qld	DAFF Qld	<i>Plant Protection Act 1989</i> <i>Plant Protection Regulation 2002</i>	Restrictions apply to the entry of machinery and equipment. Contact Biosecurity Queensland through the DAFF Queensland Customer Service Centre on (07) 3404 6999.
SA	PIRSA	<i>Plant Health Act 2009</i>	Restrictions apply to freedom from soil and plant material for the movement of used agricultural machinery into SA to prevent introduction of pests and diseases of interest e.g. Phylloxera or Potato cyst nematodes.

State	Authority	Legislation	Control procedures
Tas	DPIPWE	<i>Plant Quarantine Act 1997</i> <i>Weed Management Act 1999</i>	Requirements regarding the inspection and cleaning of machinery coming to Tasmania are covered by the <i>Plant Quarantine Act 1997</i> (Section 55), Sections 2.6 to 2.8 of the <i>Plant Quarantine Manual Tasmania</i> , and the <i>Weed Management Act 1999</i> . Machinery and equipment must be free from soil, plant trash, plants, declared weed seeds and other declared diseases or organisms.
Vic	Vic DPI	<i>Plant Biosecurity Act 2010</i> <i>Plant Health and Plant Products Regulations 2006</i>	Restrictions apply to movement of machinery into or within Victoria to prevent spread of pests and diseases of interest e.g. Fire ants, Potato cyst nematodes or Grapevine phylloxera.
WA	DAFWA	<i>Plant Diseases Act 1914</i> <i>Plant Diseases Regulations 1989</i> <i>Biosecurity and Agricultural Management Act 2007</i> ⁵¹	Machinery and equipment entering the state is subject to inspection on arrival and must be free from soil and plant material. A movement permit must be obtained.

Farm/regional activities

Responsibility > industry/growers

It is in the interests of industry to encourage and monitor the management of biosecurity risks at the farm level, as this will reduce the probability of an incursion and increase the probability of early detection. This should in turn reduce the likelihood of a costly incident response, thereby reducing the costs to the industry, governments and the wider community. Suggested practices for minimising pest spread at the farm level include:

- ensuring that all visitors to the farm report directly to the office on arrival
- checking that machinery, vehicles, and equipment (e.g. trailers, crates, bins) entering or leaving properties are free of soil and crop debris
- visually inspecting machinery and equipment before it comes onto the property and denying access to any equipment that does not meet biosecurity standards
- restricting movements of vehicles and people (if possible) during high risk periods, including avoiding moving vehicles and machinery particularly when roads are wet and muddy
- wash and disinfect equipment used in high risk areas to avoid transferring pests and diseases to other areas of the farm
- ensuring all visitors and employees are aware of the importance of keeping footwear and clothing free from loose dirt and vegetable matter before entering or leaving the property
- providing wash down facilities for both machinery and people (e.g. high pressure hose with a concrete or tarmac pad, scrubbing brushes and footbaths)

⁵¹ Will replace *Plant Diseases Act 1914* and *Plant Diseases Regulations 1989*. Implementation soon to be underway.

- providing a designated parking area and transporting visitors, contractors, employees and government officials using vehicles based permanently on the property
- minimising unnecessary entry of vehicles from outside the farm and movements of vehicles around the farm (especially when the soil is wet)
- reporting all suspected exotic pests to your relevant agriculture department or the Exotic Plant Pest Hotline (1800 084 881).

Movement of people

Bottom line People can also carry pests, particularly on boots and clothing. Inform people of your biosecurity measures and provide hygiene options such as foot baths to minimise pest spread via visitors.

Movement of people between farms and between regions can also potentially spread pests, especially on muddy boots and clothing that have been worn on another farm. While it is not practical to stop movements of people on and off your farm, a number of measures can be used to reduce spread of pests by this route. Possible strategies are:

- ensure all visitors to your property report directly to your office or house on arrival
- ensure all visitors and employees are aware of the importance of keeping footwear and clothing free from loose dirt and plant matter before entering or leaving the property
- supply footwear or footbaths (with a scrubbing brush) to avoid spread of soil or mud, and use a strong cleansing solution in the footbath such as 'Farmcleanse' detergent
- use signs to alert people that biosecurity measures need to be undertaken and to report to the office/house
- brief staff, contractors and visitors on your farm hygiene measures
- undertake biosecurity/quarantine training for employees and other personnel
- be aware if your visitors have recently arrived from overseas.

Visiting overseas farms/orchards – what to watch out for when you return

Bottom line Production regions overseas may have devastating pests that Australia does not have – before returning, wash your clothes, boots and hair, and declare your visit to quarantine!

When visiting production regions and farms overseas that may have pests not present in Australia, care should be taken not to inadvertently introduce these pests into Australia. Prior

to returning from a visit, individuals should thoroughly wash all clothing and footwear used during the visit as well as their hair, which may carry bacterial and fungal spores. Also, any visits to farms/orchards should be declared on re-entry documentation as required.

Including farm biosecurity in Industry Best Management Practice and Quality Assurance schemes

Bottom line	Growing onions following Best Management Practice and Quality Assurance schemes ensures high quality produce and reductions in pest impact and spread
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Responsibility > industry/growers and nursery operators

For farm level protection from pests, the following farm biosecurity (farm hygiene) measures are recommended:

- using disease-free seed for propagation of onion crops, including packing seed in sealed containers and carrying identifying stockmarks for tracking origin of product
- using disease-free bulbs for growing seed crops
- seeking advice from the state/territory agriculture department before transporting plant material between growing regions or interstate
- inspecting all incoming vehicles and equipment for signs of contaminated soil or plant material and enforcing biosecurity standards
- using high pressure wash down facilities associated with a concrete or tarmac pad for cleaning vehicles and equipment, with treatment and disposal of effluent away from plants and irrigation sources
- disposing of farm waste away from crops or propagating areas
- undertaking a biosecurity/quarantine education and training program for employees and related personnel
- having a planned, effective monitoring and pest management program
- erecting informative signs at the entrance of the property which outline the basic biosecurity requirements for all visitors
- reporting all suspect diseased plants and pests to the local state/territory agriculture department, for identification
- minimising vehicle movement around the farm
- including supplier information with produce consignments and maintaining source and destination records
- training staff in effective use of relevant chemicals
- disposing of unwanted plants and reporting neglected crops and volunteer plants to the local state/territory agriculture department

- managing visitor movement around the farm by using vehicles which remain on the property, and supplying footwear or footbaths
- keeping public sales and tourist activities separate from the farm area.

Including such measures in Industry Best Management Practice (IBMP) and Quality Assurance (QA) schemes will strengthen the ability to rapidly detect, control and eradicate exotic pest incursions in the onion industry before extensive damage occurs. IBMP and QA schemes that cover some of the above biosecurity measures are listed in Table 21. At present, around 80% of onion growers are 'Freshcare' accredited.

Table 21. *Onion industry IBMP and QA schemes*

Scheme	Key areas of biosecurity relevance
Freshcare Code of Practice	Freshcare is the industry-owned, national, on-farm food safety program for the fresh produce industry. Freshcare links food safety on farm to the quality and food safety programs of the other members of the fresh produce supply chain.
Codex Hazard Analysis Critical Control Point (HACCP)	HACCP certification provides a recognised endorsement of food safety excellence.
Safe Quality Food (SQF) 2000 for packers and processors & SQF 1000 for producers	SQF Codes provide primary producers (SQF 1000) and food manufacturers, retailers, agents and exporters (SQF 2000) with a food safety and quality management certification program that is tailored to their requirements and enables suppliers to meet regulatory, food safety and commercial quality criteria. The SQF Codes are owned and managed by the Food Marketing Institute of the USA.
Woolworths Quality Assurance Standard (WQA)	WQA is focussed on both quality and safety of all products supplied. All Trade Partners that are suppliers of Fresh Food or Private Label products to Woolworths are required to attain certification to the WQA Standard, in addition to existing regulatory or voluntary audits that may be currently in place.

Pollination services and biosecurity

Bottom line Encouraging good hive biosecurity practices provides benefits to beekeepers and growers, and protects the honey and pollination-dependent industries

Responsibility > industry/growers and nursery operators

The pollination services used for seed production bring contractors with special biosecurity considerations onto your property. Through the pollination process, bees moving between plants provide a mechanism for the spread of plant pests. These can also be spread between regions when hives are moved. In addition, there are a number of key biosecurity threats to bees⁵². The highest priority is the Varroa mite (*Varroa destructor*).

⁵² Pest threats to honey bees are not included in the treat summary tables of this IBP. These will be assessed through the Honey bee IBP.

Onion seed producers should expect hive providers to:

- check the health of any newly purchased bees, including asking for a vendor/beekeeper declaration of health status
- specifically check bees and brood for signs of disease
- maintain strong hives that are not susceptible to pest attack
- avoid placing hives in proximity to rubbish tips
- avoid placing hives near abandoned hives, as these are more likely to be diseased
- avoid placing hives near abandoned farms which might have pests that can be carried on bees
- regularly inspect bees for unusual behaviour
- isolate captured swarms for six months to ensure they are free from pests before adding them to the main apiary
- check swarms for unusual bees as they may be an exotic bee species
- ensure all hives are registered and branded so there is no confusion about ownership.

Working together to reduce biosecurity threats, onion seed producers and hive producers should:

- ensure a clean water source is available for bees
- ensure all farm and hive equipment is cleaned between uses
- wash and disinfect hands before and after handling hives
- ensure boots and clothing are free from plant material, soil, insects and other pests before entering and leaving farms or handling hives
- minimise the number of people that visit hives
- prevent vehicles from driving close to hives
- secure honey stores and sticky frames so robbing bees cannot gain access
- check hives when monitoring the farm and report any unexplained decline in bee numbers, crawling or dead bees near hive entrances or any unusual bee behaviour
- advise your hive provider of any intended use of chemicals that might be harmful to bees.

Farm biosecurity checklist

Use this checklist to do a quick biosecurity assessment of your property, and see sections of this document for further detail on each point.

Farm biosecurity checklist	Yes	No
Do you have information signs placed at the entry gate to demonstrate your hygiene/biosecurity measures?		
Do you maintain secure boundary fences?		
Do you provide movement controls (people and vehicles) and wash down areas/footbaths to prevent spread of pests onto your property?		
Do you have designated parking for visitors?		
Do you provide on-property transport for visitors?		
Has visiting machinery been cleaned correctly?		
Do you use high health seed and bulb stock?		
Do you ensure that you and your staff are adequately trained in the correct use of pesticides?		
Do you provide biosecurity training and awareness for farm staff?		
Do you use quality assurance and/or best management practice systems?		
Have you sought advice from a farm consultant in developing and implementing your farm's biosecurity plan?		
Have you been to an overseas farm or a suspect area? Wash your clothes, boots and hair, and declare your international visit to quarantine!		

Further information in relation to farm biosecurity can be found on the PHA website under biosecurity (www.planthealthaustralia.com.au/go/phau/biosecurity) or the farm biosecurity website (www.farmbiosecurity.com.au).

Reporting suspect pests



Any unusual plant pest should be reported immediately to the relevant state/territory agriculture agency through the Exotic Plant Pest Hotline (1800 084 881). Early reporting enhances the chance of effective control and eradication.

Reporting an exotic plant pest carries serious implications and should be done only via the Exotic Plant Pest Hotline. Careless use of information, particularly if a pest has not been confirmed, can result in extreme stress for individuals and communities, and possibly damaging and unwarranted trade restrictions.

If you suspect a new pest, call the Exotic Plant Pest Hotline on 1800 084 881

Calls to the Exotic Plant Pest Hotline will be forwarded to an experienced person in the department of agriculture from the state of origin of the call, who will ask some questions about what you have seen and may arrange to collect a sample. Every report will be taken seriously, checked out and treated confidentially.

In some states and territories, the Exotic Plant Pest Hotline only operates during business hours. Where this is the case, and calls are made out of hours, callers should leave a message including contact details and staff from the department of agriculture will return the call the following business day.

Some onion pests are notifiable under each state or territory's quarantine legislation. The complete list of notifiable pests can be downloaded from the PHA website⁵³; however, each state's list of notifiable pests are subject to change over time so contacting your local state/territory agricultural department (details in Table 13) will ensure information is up to date. Landowners and consultants have a legal obligation to notify the relevant state/territory agriculture department of the presence of those pests within a defined timeframe (Table 22).

Table 22. *Timeframe for reporting of notifiable pests as defined in state/territory legislation*

State/territory	Notifiable pest must be reported within
NSW	24 hours
NT	24 hours
Qld	24 hours
SA	Immediately
Tas	As soon as possible
Vic	Without delay
WA	24 hours

Suspect material should not generally be moved or collected without seeking advice from the relevant state/territory department, as incorrect handling of samples could spread the pest or render the samples unsuitable for diagnostic purposes. State/territory agriculture department officers will usually be responsible for sampling and identification of pests.

⁵³ Available from www.planthealthaustralia.com.au/go/phau/biosecurity/general-biosecurity-information

Reference

DAFF (2011) Import Risk Analysis Handbook 2011. Australian Government Department of Agriculture, Fisheries and Forestry, Canberra.

CONTINGENCY PLANS AND RESPONSE MANAGEMENT PROCEDURES

Introduction – emergency response

Gathering information, developing procedures, and defining roles and responsibilities during an emergency can be extremely difficult. To address this area, PHA coordinated the development of PLANTPLAN, a national set of incursion response guidelines for the plant sector, detailing procedures required and the roles and responsibilities of all parties involved in an incursion response.

Following PLANTPLAN, a set of threat-specific contingency plans will be developed to cover the key exotic pests to the onion industry. These pests are detailed in the high priority plant pest threat list (Table 5) and have been identified through a process of qualitative risk assessment. Information will be provided on the host range, symptoms, biology and epidemiology of each pest, along with guidelines for general and targeted surveillance programs, diagnosis, and control. These documents are designed to assist with the development of response plans and will be used in conjunction with the emergency response guidelines in PLANTPLAN.

This section includes key contact details and any communication procedures that should be used in the event of an incursion in the onion industry. Additionally, a listing of pest-specific emergency response and information documents are provided. Over time, as more of these documents are produced for pests of the onion industry they will be included in this document and made available through the PHA website.

PLANTPLAN

PLANTPLAN provides a description of the general procedures, management structure and information flow system for the handling of a plant pest emergency at national, state/territory and district levels. This includes the operations of the control centres, principles for the chain of responsibility, functions of sections and role descriptions. PLANTPLAN is a general manual for use by all jurisdictions for all plant pest emergencies.

PLANTPLAN is regularly reviewed and updated to ensure it provides the best possible guidance to plant industries and governments in responding to serious plant pests. The most recent version of PLANTPLAN can be downloaded from the PHA website (www.planthealthaustralia.com.au/plantplan).

Current response management procedures

Following the detection of a suspect exotic plant pest, the relevant state agency should be immediately notified directly or through the Exotic Plant Pest Hotline. Within 24 hours of the initial identification, the agency, through the State Plant Health Manager, will inform the Australian Chief Plant Protection Office (ACPPPO) which will notify other relevant Australian Government Departments and relevant state agencies and industry representatives (process outlined in Figure 9). Following the detection or reporting of the pest, the relevant state/territory agriculture agency may collect samples of a suspect pest and seek a positive identification. If the pest is suspected to be an exotic pest (not yet present in Australia), the general process is as outlined in Figure 9.

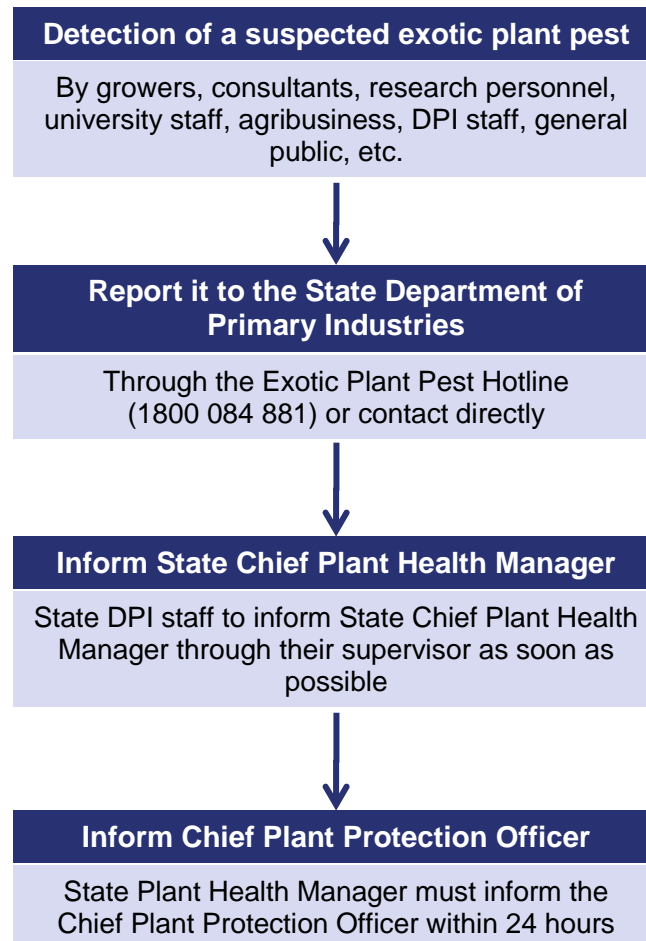


Figure 9. Suspect exotic plant pest detection reporting flowchart

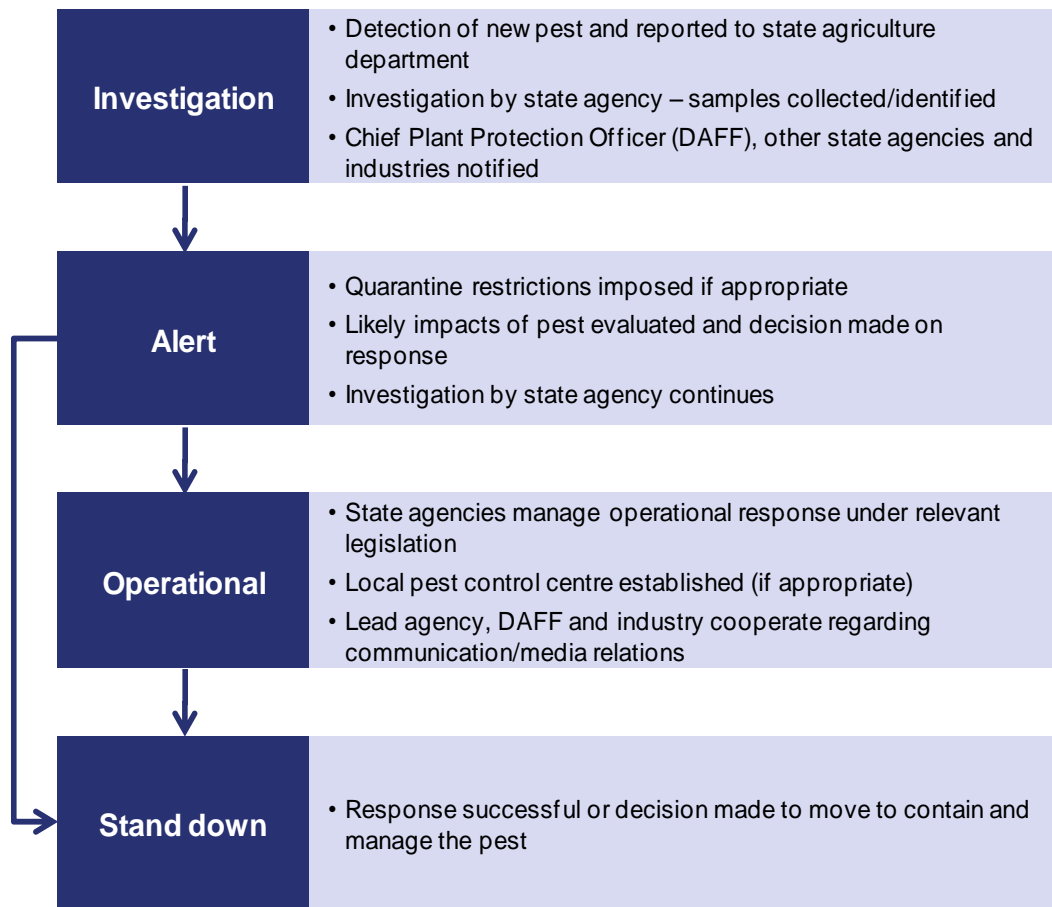


Figure 10. General decision making and communication chain for a plant pest emergency response

If the pest is considered potentially serious, then the relevant state/territory agriculture department may adopt precautionary measures. These measures, depending on the pest, may include:

- restriction of operations in the area
- withdrawal of people, vehicles and machinery from the area and disinfection
- restricted access to the area
- interim control or containment measures.

If a new plant pest is confirmed, technical and economic considerations are reviewed, and a decision made on whether to eradicate, contain or do nothing about the incursion (depending on the feasibility of the response and likely costs and impacts of the pest). Under the EPPRD all decisions are made by Committees with government and industry representation.

During this investigation/alert period, the affected area will be placed under quarantine until a decision is made on whether to eradicate or control the pest. Once a decision has been made

on a suitable response, efforts enter the operational phase. Eradication or control methods used will vary according to the nature of the pest involved and infested material will be destroyed where necessary. All on ground response operations are undertaken by the relevant state department(s) in accord with relevant state/territory legislation.

In the stand down phase, all operations are wound down. Where a plant pest emergency was not confirmed, those involved will be advised that the threat no longer exists. Where an eradication or management/control campaign has taken place, quarantine measures will be finalised and reviewed.

Industry specific response procedures

Industry communication

In the event of a pest incursion affecting the onion industry, Onions Australia will be the key industry contact point and will have responsibility for relevant industry communication and media relations (see PLANTPLAN for approved communications during an incursion). Onions Australia should be contacted immediately (Table 23) to ensure those appropriate delegate/s are secured for meetings of the Consultative Committee or National Management Group.

Close cooperation is required between relevant government bodies and industry in regards to the effective management of a pest response and media/communication issues. Readers should refer to PLANTPLAN⁵⁴ for further information.

Table 23. Contact details for Onions Australia

Website	www.onionsaustralia.org.au
Postal address	105A Commercial St East Mount Gambier East SA 5290
Telephone	(08) 8725 8862
Fax	(08) 8725 8863
Mobile	0437 385510
Email	onionsaust@bigpond.com
Contact	Joanne Thomas-Ward Chief Executive Officer

⁵⁴ A copy of PLANTPLAN is available from www.planthealthaustralia.com.au/plantplan

Counselling and support services

Provision for counselling and advice on financial support for growers is made available through various agencies as listed in Table 24. Up-to-date information relating to mental health can be found at <http://www.health.gov.au/mentalhealth>. Local providers of counselling services can be found through contacting your local state or territory agriculture agency (Table 13) or your growers association (Table 23).

Table 24. *Counselling and financial counselling services*

Organisation	Contact
Lifeline	13 11 14 (24 hours) www.lifeline.org.au Anyone can call Lifeline. The 13 11 14 service offers a counselling service that respects everyone's right to be heard, understood and cared for. We also provide information about other support services that are available in communities around Australia.
Mensline	1300 789 978 (24 hours) www.menslineaus.org.au Mensline Australia is a dedicated service for men with relationship and family concerns.
Kids Help Line	1800 551 800 (24 hours) www.kidshelpline.com.au Kids Help Line is Australia's only free, confidential and anonymous, telephone and online counselling service specifically for young people aged between 5 and 25.
BeyondBlue	1300 224 636 www.beyondblue.org.au Beyondblue is an independent, not-for-profit organisation working to increase awareness and understanding of depression, anxiety and related substance-use disorders throughout Australia and reduce the associated stigma
Centrelink	13 23 16 (Drought Assistance Hotline) www.humanservices.gov.au/customer/subjects/drought-assistance The Exceptional Circumstances Relief Payment (ECRP) is delivered by Centrelink on behalf of the Department of Agriculture, Fisheries and Forestry. The payment provides assistance to farmers living in 'exceptional circumstances' affected areas who are having difficulty meeting family and personal living expenses.

Organisation	Contact
Rural Financial Counselling Service	<p>1800 686 175 (free call for referral to your nearest Rural Financial Counselling Service provider)</p> <p>www.daff.gov.au/agriculture-food/drought/rfcs</p> <p>Rural financial counsellors can:</p> <ul style="list-style-type: none"> • help clients identify financial and business options • help clients negotiate with their lenders • help clients adjust to climate change through the Climate Change Adjustment Program, identify any advice and training needed and develop an action plan • help clients meet their mutual obligations under the Transitional Income Support program • give clients information about government and other assistance schemes • refer clients to accountants, agricultural advisers and educational services • refer clients to Centrelink and to professionals for succession planning, family mediation and personal, emotional and social counselling.
DAFF Queensland Farm Financial Counselling Service	<p>13 25 23 DAFF Queensland Customer Service Centre</p> <p>DAFF Queensland financial counsellors can help you:</p> <ul style="list-style-type: none"> • understand and develop improved financial management • negotiate with financial institutions • identify and assess the financial impact of options • compare the viability of various enterprises • prepare applications for loans and government assistance schemes through the Queensland Rural Adjustment Authority (QRAA) and Centrelink.

Pest-specific emergency response and information documents

As part of the implementation of the IBP, pest-specific information and emergency response documents, such as fact sheets, contingency plans and diagnostic protocols should be developed over time for all medium to high risk pests listed in the TST (Appendix 1). Currently, a number of documents have been developed for pests of the onion industry (Table 25) and are available for download from the Pest Information Document Database at www.planthealthaustralia.com.au/pidd.

Table 25. Pest-specific information documents for the onion industry⁵⁵

Common name	Scientific name	Fact sheet	Pest risk review ⁵⁶	Contingency plan
Black cutworm ⁵⁷	<i>Agrotis segetum</i>			✓ ⁵⁸
Leaf blight	<i>Botrytis squamosa</i>	✓	✓	
Pea leafminer	<i>Chromatomyia horticola</i>			✓ ⁵⁹
Onion fly	<i>Delia antiqua</i>	✓	✓	
Lesser bulb fly	<i>Eumerus strigatus</i>	✓	✓	
Pea leafminer	<i>Liriomyza huidobrensis</i>	✓	✓ ⁶⁰	✓ ⁵⁹
American leafminer	<i>Liriomyza sativae</i>	✓	✓ ⁶⁰	✓ ⁵⁹
American serpentine leafminer	<i>Liriomyza trifolii</i>	✓	✓ ⁶⁰	✓ ⁵⁹
Allium leafminer	<i>Phytomyza gymnostoma</i>	✓		
Bulb mite	<i>Rhizoglyphus callae</i>		✓	
Bulb mite	<i>Rhizoglyphus setosus</i>		✓	

National diagnostic standards for priority plant pest threats

National diagnostic standards have been commissioned for a number of exotic/emergency plant pests. These protocols would be used nationally in the event of an incursion, thus ensuring a rapid response and nationally consistent test results that are directly comparable. However, given the rapid development of improved molecular diagnostic techniques, these protocols need to be regularly reviewed and updated.

The development and endorsement of these protocols is managed by SPHDS. Diagnostic standards that have been formally nationally endorsed are available on the SPHDS website (www.padil.gov.au/Sphds). For pests in which there is currently no nationally endorsed diagnostic protocol, diagnostic information can be accessed through the PaDIL Biosecurity Toolbox (www.old.padil.gov.au/pbt). Further information on diagnostic standards and their endorsement process can be found on the SPHDS website.

⁵⁵ Copies of these documents are available from www.planthealthaustralia.com.au/pidd

⁵⁶ Over time, pest risk reviews will be updated through the development of pest specific contingency plans

⁵⁷ Synonyms: Turnip moth, Common cutworm, Dart moth, Tobacco cutworm, Turnip dart moth

⁵⁸ Developed by the Office of the Chief Plant Protection Officer (now called ACPPO)

⁵⁹ Developed for Grains IBP

⁶⁰ Developed for Vegetable IBP

Reference

Plant Health Australia (2011) PLANTPLAN: Australian Emergency Plant Pest Response Plan. Plant Health Australia, Canberra, ACT. (www.planthealthaustralia.com.au/plantplan)

APPENDIX 1: THREAT SUMMARY TABLES

Onion industry threat summary tables

The information provided in the TSTs (invertebrates, Table 26 and pathogens, Table 27) is an overview of exotic plant pest threats to the onion industry. Summarised information on entry, establishment and spread potentials and economic consequences of establishment are provided where available. Pests under official control⁶¹ or eradication may be included in these tables where appropriate. However, onion pests that are endemic but regionalised within Australia are not covered by IBPs, but may be assessed in state biosecurity plans. Assessments may change given more detailed research, and will be reviewed with the biosecurity plan.

Additional information on a number of the pests listed in the TSTs can be found in pest-specific information documents (Table 25). An explanation of the method used for calculating the overall risk can be found on the PHA website⁶².

Description of terms

The descriptions below relate to terms in the TSTs (Table 26 and Table 27). Full descriptions of the risk rating terms can be found on page 24.

Life form legend

Bac	Bacteria
Btle	Beetles, weevils, etc. (COLEOPTERA)
Bug	Stink bugs, aphids, mealybugs, scale, whiteflies and hoppers (HEMIPTERA)
Fly	Flies and midges (DIPTERA)
Fun	Fungus
Lep	Butterflies and moths (LEPIDOPTERA)
Loc	Grasshoppers and locusts (ORTHOPTERA)
Mite	Mites e.g. spider and gall mites (ACARI)
Nem	Nematode
Thri	Thrips (THYSANOPTERA)
Vir	Viruses and viroids

⁶¹ Official control defined in ISPM No. 5 as the active enforcement of mandatory phytosanitary regulations and the application of mandatory procedures with the objective of eradication or containment of quarantine pests or for the management of regulated non-quarantine pests

⁶² Available from www.planthealthaustralia.com.au/go/phau/biosecurity/general-biosecurity-information

Invertebrates

Table 26: Onion invertebrate threat summary table

Gaps indicate insufficient information available to make an assessment of risk

Common name	Life form	Scientific name	Primary hosts	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Allium leafminer	Lep	<i>Acrolepia sapporensis</i>	Onion, shallot, garlic, leek, Japanese bunching onion and Welsh onion	Foliage	HIGH	LOW	LOW	LOW	NEGLIGIBLE
Leek moth	Lep	<i>Acrolepiopsis assectella</i>	Onion, leek, garlic, shallot, chives and Welsh onion	Bulb, foliage, flowering heads	LOW	LOW	MEDIUM	MEDIUM ⁶³	VERY LOW
Common click beetle ⁶⁴	Btle	<i>Agriotes lineatus</i>	Polyphagous; All <i>Allium</i> spp., potato, corn, carrot and tomato	Seedlings, foliage, external feeding	MEDIUM	HIGH ⁶⁵	MEDIUM	MEDIUM	LOW
Heart and dart moth	Lep	<i>Agrotis exclamationis</i>	Polyphagous; Onion, lucerne, tomato, potato, wheat and corn	Foliage, stems, roots	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Black cutworm ⁶⁶	Lep	<i>Agrotis segetum</i>	Polyphagous; Onion, leek, round headed garlic, blackcurrant, grapevine, cotton, potato, tomato and ornamentals (daisy, carnation)	Foliage, roots	HIGH ⁶⁷	HIGH ⁶⁵	HIGH	MEDIUM ⁶⁸	MEDIUM
Cutworm	Lep	<i>Agrotis tokionis</i>	Onion, tobacco, potato, wheat and corn	Foliage	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE

⁶³ Larvae mine stem inducing bulb rot

⁶⁴ Synonyms: Elaterid beetle, Lined click beetle, Striped elaterid beetle, Wireworm

⁶⁵ Hosted on a wide range of agricultural crops

⁶⁶ Synonyms: Turnip moth, Common cutworm, Dart moth, Tobacco cutworm, Turnip dart moth

⁶⁷ Infested plant material or in soil contaminating shipments; both larvae and pupae can hide within infested bulbs

⁶⁸ Onions not a major host

Common name	Life form	Scientific name	Primary hosts	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Sting nematode	Nem	<i>Belonolaimus gracilis</i>	Polyphagous; Onion, pea, bean, pine, cucurbits, peanut, corn, cotton, strawberry, oat, citrus, tomato and turfgrasses	Roots	MEDIUM	HIGH	MEDIUM	LOW	VERY LOW
Sting nematode	Nem	<i>Belonolaimus longicaudatus</i>	Polyphagous; Onion, pea, bean, potato, grape, peanut, citrus, melon, carrot, strawberry, cotton, corn, tomato and turfgrasses	Roots	LOW ⁶⁹	MEDIUM ⁷⁰	LOW ⁷¹	MEDIUM ⁷²	VERY LOW
Onion thrips⁷³	Thri	<i>Caliothrips indicus</i>	Onion, garlic, leek, groundnut, soyabean and <i>Fabaceae</i>	Foliage	MEDIUM	LOW	MEDIUM	LOW	VERY LOW
	Bug	<i>Capsodes lineolatus</i>	Onion	Foliage					
	Fly	<i>Ceroxys latiusculus</i>	Onion	Bulb	HIGH		HIGH		
Onion weevil	Btle	<i>Ceutorhynchus jakovlevi</i>	Onion and garlic	Foliage				LOW	
Onion weevil	Btle	<i>Ceutorhynchus suturalis</i>	Onion	Foliage	LOW	LOW		MEDIUM	
Pea leafminer⁷⁴	Fly	<i>Chromatomyia horticola</i>	Polyphagous; <i>Allium</i> spp., cucurbits, lettuce, bean, pea, tomato and daisy	Foliage	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW
Cyclamen tortrix⁷⁵	Lep	<i>Clepsis spectrana</i>	Polyphagous; Onion, apple, broccoli, Brussels sprouts, cauliflower, grapevine and blackcurrant	Foliage	LOW	LOW			
	Btle	<i>Colaphellus alpinus</i>	Onion						

⁶⁹ Commonly arrives in shipments containing turf/soil

⁷⁰ Large host range and conducive to Australian soils and climate

⁷¹ Not seed borne

⁷² Particularly harmful in young plants

⁷³ Synonyms: Black thrips, Pea thrips

⁷⁴ Synonyms: Cruciferous leafminer, Chrysanthemum leafminer

⁷⁵ Synonym: Oblique-banded caterpillar

Common name	Life form	Scientific name	Primary hosts	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
	Lep	<i>Copitarsia</i> spp.	Onion	Foliage	LOW			MEDIUM	
	Btle	<i>Ctenicera strangulata</i>	Onion and garlic	Roots	MEDIUM	LOW	LOW	MEDIUM	VERY LOW
Cassava root bug ⁷⁶	Bug	<i>Cyrtomenus bergi</i>	Onion, cassava and corn	Bulb	LOW	MEDIUM	LOW	NEGLIGIBLE	
Onion fly	Fly	<i>Delia antiqua</i>	Onion, shallot, Japanese bunching onion or Welsh onion, leek, garlic and chives	Bulb, foliage, roots, seedling	HIGH ⁷⁷	MEDIUM	HIGH	HIGH ⁷⁸	HIGH
Turnip maggot	Fly	<i>Delia floralis</i>	Onion, turnip, leek and <i>Brassicaceae</i>	Roots, stems	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Bean fly ⁷⁹	Fly	<i>Delia florilega</i>	Onion, leek, garlic, <i>Brassicaceae</i> , tomato, potato and corn	Bulb, seedling	HIGH	MEDIUM	HIGH	HIGH ⁸⁰	HIGH
Onion maggot	Fly	<i>Delia hirticrura</i>	<i>Allium</i> spp.	Seedling	HIGH	MEDIUM	HIGH		
	Bug	<i>Dolycoris indicus</i>	Onion	Flowers	LOW	LOW	MEDIUM	LOW	NEGLIGIBLE
Garlic borer ⁸¹	Lep	<i>Dyspessa ulula</i>	Onion and garlic	Bulb	HIGH	LOW	HIGH	HIGH	MEDIUM
Potato flea beetle	Btle	<i>Epitrix cucumeris</i>	Onions, leek and garlic		LOW	MEDIUM	LOW	LOW	NEGLIGIBLE
Salt marsh caterpillar	Lep	<i>Estigmene acraea</i>	Onion, <i>Brassica</i> spp. and bean	Whole plant	UNKNOWN	MEDIUM	MEDIUM	LOW	NEGLIGIBLE – VERY LOW
Onion bulb fly ⁸²	Fly	<i>Eumerus amoenus</i>	Onion	Bulb	HIGH ⁸³	MEDIUM ⁸⁴	HIGH ⁸⁵	HIGH ⁸⁶	HIGH

⁷⁶ Synonym: Shield bug

⁷⁷ Larvae imported inside bulbs

⁷⁸ Particularly for crops establishing

⁷⁹ Synonyms: Bean seed maggot, Potato maggot, Turnip maggot

⁸⁰ High impact on seeds and seedlings

⁸¹ Synonym: Garlic moth

⁸² Synonym: Mediterranean lesser bulb fly

⁸³ Risk of the pupae adhering to the bulbs and larvae being present in damaged bulbs

⁸⁴ Possibly not well adapted to climatic conditions in growing regions

⁸⁵ Capable of flight

⁸⁶ Known to cause significant loss in Egypt

Common name	Life form	Scientific name	Primary hosts	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Lesser bulb fly ⁸⁷	Fly	<i>Eumerus strigatus</i>	Onion and garlic	Bulb	HIGH ⁸⁸	HIGH ⁸⁹	HIGH ⁹⁰	HIGH ⁹¹	HIGH
	Fly	<i>Euxesta anna</i>	Onion	Bulb					
Cherry worm ⁹²	Fly	<i>Euxesta notata</i>	Onion	Bulb					
Army worm	Lep	<i>Euxoa tritici</i>	Onion	Foliage			HIGH	HIGH	
Army worm	Lep	<i>Faronta</i> spp.	Onion	Foliage			HIGH	HIGH	
Eastern flower thrips	Thri	<i>Frankliniella intonsa</i>	Polyphagous; Onion, chrysanthemum, strawberry, rice, pea, bean, peach, cotton, tomato and bell pepper	Foliage	HIGH ⁹³	HIGH ⁹⁴	MEDIUM ⁹⁵	MEDIUM ⁹⁶	MEDIUM
	Thri	<i>Frankliniella tenuicornis</i>	Onion, Japanese, bunching onion, Welsh onion, garlic	Flowers, foliage	HIGH ⁹³	HIGH ⁹⁴	MEDIUM	MEDIUM ⁹⁶	MEDIUM
Stone leek leaf beetle	Btle	<i>Galeruca daurica</i>	Onion and wild onion	Foliage					
	Btle	<i>Galeruca tanacetii</i>	Onion, chives, leek, garlic and shallot	Foliage					
	Btle	<i>Gronopus inaequalis</i>	Onion						

⁸⁷ Synonym: Onion bulb fly, Small narcissus fly

⁸⁸ Detections already made at border

⁸⁹ Suitable hosts are present

⁹⁰ Adults capable of strong flight

⁹¹ Pest of onions grown from seed

⁹² Synonym: Root spotted fly

⁹³ Tiny size, eggs inside plant

⁹⁴ Wide host range, parthenogenesis

⁹⁵ Not strong flyers

⁹⁶ Potential vector of viruses

Common name	Life form	Scientific name	Primary hosts	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Double-striped pug⁹⁷	Lep	<i>Gymnoscelis rufifasciata</i> ⁹⁸	Polyphagous; Onion, raspberry, citrus, olive, corn, sorghum and carnation	Flowers, seeds	LOW	MEDIUM	HIGH	LOW	VERY LOW
Clover cutworm	Lep	<i>Hadula trifolii</i>	Onion, leek, cabbage, Lucerne and corn	Foliage	MEDIUM	MEDIUM	HIGH	LOW	VERY LOW
Cereal thrips⁹⁹	Thri	<i>Haplothrips aculeatus</i>	Polyphagous; Onion, cotton, oats, barley, rice, sugarcane, rye, wheat, maize	Foliage, seeds	HIGH	MEDIUM	HIGH	LOW	LOW
Onion stem borer	Lep	<i>Hydraecia mongoliensis</i>	Onion	Stem	LOW	LOW	HIGH	HIGH	LOW
Bright-line brown-eye moth	Lep	<i>Lacanobia oleracea</i>	Onion, <i>Brassica</i> spp. and tomato	Foliage	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Lily beetle	Btle	<i>Lilioceris lili</i>	Onion and garlic	Foliage	MEDIUM ¹⁰⁰	MEDIUM ¹⁰¹	HIGH ¹⁰²	LOW ¹⁰³	VERY LOW
Lily beetle	Btle	<i>Lilioceris merdigera</i>	Onion and garlic	Foliage	MEDIUM ¹⁰⁰	MEDIUM ¹⁰¹	HIGH ¹⁰²	LOW ¹⁰³	VERY LOW
Onion plant bug	Bug	<i>Lindbergocapsus allii</i>	Onion	Foliage	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Onion leafminer	Fly	<i>Liriomyza cepae</i>	Onion and garlic	Bulb, foliage	HIGH	MEDIUM	MEDIUM ¹⁰⁴	HIGH ¹⁰⁵	MEDIUM
Stone leek leafminer	Fly	<i>Liriomyza chinensis</i>	Onion and leek	Foliage	HIGH	MEDIUM	MEDIUM ¹⁰⁴	MEDIUM ¹⁰⁶	LOW
Pea leafminer¹⁰⁷	Fly	<i>Liriomyza huidobrensis</i>	Onion and garlic	Foliage	HIGH	HIGH	MEDIUM	MEDIUM	MEDIUM
	Fly	<i>Liriomyza nitzkei</i>	Onion, leek and garlic	Foliage	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW

⁹⁷ Synonym: Olive geometrid moth

⁹⁸ Synonym: *Gymnoscelis pumilata*

⁹⁹ Synonyms: Grass thrips, Rice aculeates thrips, Rye thrips

¹⁰⁰ Entry through lilies and bulb imports

¹⁰¹ Can establish in urban areas through lilies in gardens

¹⁰² Strong flyers

¹⁰³ Not a major pest of onions

¹⁰⁴ Not strong flyers

¹⁰⁵ Feed on bulbs and foliage

¹⁰⁶ Only feed on foliage

¹⁰⁷ Synonyms: Serpentine leafminer, South American leafminer, Potato leafminer

Common name	Life form	Scientific name	Primary hosts	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
American leafminer ¹⁰⁸	Fly	<i>Liriomyza sativae</i>	Polyphagous; <i>Allium</i> spp., bean, pea, potato and tomato	Foliage	HIGH	HIGH	MEDIUM	HIGH	HIGH
American serpentine leafminer ¹⁰⁹	Fly	<i>Liriomyza trifolii</i>	Onion, garlic and chives	Foliage	HIGH	HIGH	MEDIUM	MEDIUM	MEDIUM
Bulb fly	Fly	<i>Lonchaea chorea</i>	Onion	Bulb	MEDIUM				
Lance nematode ¹¹⁰	Nem	<i>Longidorus vineacola</i>	Onion	Roots			LOW		
Beet webworm ¹¹¹	Lep	<i>Loxostege sticticalis</i>	Onion	Foliage	HIGH	HIGH ¹¹²	HIGH ¹¹³	MEDIUM	MEDIUM
Lucerne plant bug ¹¹⁴	Bug	<i>Lygus elisus</i>	Onion	Seedling					
	Bug	<i>Lygus gemellatus</i>	Onion		LOW			LOW	
Western plant bug	Bug	<i>Lygus hesperus</i>	Onion	Seedling					
Aster leafhopper ¹¹⁵	Bug	<i>Macrostelus quadrilineatus</i>	Onion				MEDIUM	MEDIUM	
Cabbage armyworm ¹¹⁶	Lep	<i>Mamestra brassicae</i>	Highly polyphagous; Onion, leek, garlic, potato, bean, pea, tomato, grapevine, <i>Brassica</i> spp.	Whole plant	LOW	HIGH	HIGH	HIGH	MEDIUM
Two striped grasshopper	Loc	<i>Melanoplus bivittatus</i>	Onion	Foliage	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Lesser migratory grasshopper	Loc	<i>Melanoplus sanguinipes</i>			LOW	HIGH	HIGH	HIGH	MEDIUM

¹⁰⁸ Synonyms: Vegetable leafminer, Cabbage leafminer, Leafminer of vegetables, Melon leafminer, Serpentine vegetable leafminer, Chrysanthemum leafminer

¹⁰⁹ Synonyms: Chrysanthemum leaf miner, Serpentine leafminer, Broad bean leafminer, Californian leafminer, Celery leafminer

¹¹⁰ Synonym: Needle nematode

¹¹¹ Synonyms: Meadow moth, Sugarbeet webworm

¹¹² Wide host range

¹¹³ Migratory

¹¹⁴ Synonym: Pale legume bug

¹¹⁵ Synonym: Six-spotted leafhopper

¹¹⁶ Synonym: Cabbage moth

Common name	Life form	Scientific name	Primary hosts	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Colombia root-knot nematode ¹¹⁷	Nem	<i>Meloidogyne chitwoodi</i>	Onion and garlic	Foliage, roots	MEDIUM ¹¹⁸	MEDIUM	LOW	LOW ¹¹⁹	NEGLIGIBLE
Rice root knot nematode	Nem	<i>Meloidogyne graminicola</i>	Onion		MEDIUM ¹¹⁸	MEDIUM ¹²⁰	LOW	LOW ¹¹⁹	NEGLIGIBLE
Large narcissus fly	Fly	<i>Merodon equestris</i>	Onion		HIGH	HIGH	MEDIUM	MEDIUM	MEDIUM
	Btle	<i>Oxycetonia versicolor</i>	Onion	Flowers	LOW	LOW	LOW	LOW	NEGLIGIBLE
Stubby root nematode	Nem	<i>Paratrichodorus allius</i>	Onion	Roots	UNKNOWN	MEDIUM ¹²¹	LOW	LOW ¹²²	NEGLIGIBLE – VERY LOW
Pearly underwing moth ¹²³	Lep	<i>Peridroma saucia</i>	Onion	Whole plant	MEDIUM	HIGH	HIGH	LOW	LOW
Allium leafminer	Fly	<i>Phytomyza gymnostoma</i>	Onion, leek, garlic and chives	Stalks and bulbs	HIGH	MEDIUM	HIGH	HIGH	HIGH
Bulb mite	Mite	<i>Rhizoglyphus callae</i>	Onion, shallot and garlic	Bulb	HIGH	HIGH	HIGH ¹²⁴	HIGH	HIGH
Bulb mite	Mite	<i>Rhizoglyphus setosus</i>	Onion, leek and garlic	Bulb	HIGH	HIGH	HIGH ¹²⁴	HIGH	HIGH
	Lep	<i>Sarcopolia illoba</i>	Onion	Bulb					
	Nem	<i>Scutellonema clathricaudatum</i>	Onion		LOW	MEDIUM ¹²⁵	LOW ¹²⁶	LOW	NEGLIGIBLE
Southern armyworm	Lep	<i>Spodoptera eridania</i>	Onion	Stalks	MEDIUM	HIGH	HIGH	LOW	LOW
Fall armyworm	Lep	<i>Spodoptera frugiperda</i>	Onion, garlic and leek		MEDIUM	HIGH	HIGH	LOW	LOW
Cotton leafworm	Lep	<i>Spodoptera littoralis</i>	Onion		LOW	HIGH	HIGH	MEDIUM	LOW

¹¹⁷ Synonym: Root-knot nematode

¹¹⁸ Widely distributed throughout the world

¹¹⁹ Not a major pest of onions

¹²⁰ Hosted by a wide range of grassy species, prefers flood plain soils

¹²¹ Found in similar climatic regions throughout the world

¹²² Onions are not a major host

¹²³ Synonym: Variegated cutworm

¹²⁴ Wide host range and spreads via contaminated plant material and soil

¹²⁵ Large host and climatic range

¹²⁶ Unable to distribute itself great distances

Common name	Life form	Scientific name	Primary hosts	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Garlic fly	Fly	<i>Suillia lurida</i>	Onion, garlic and leek	Bulb, foliage	MEDIUM		MEDIUM	MEDIUM	
	Fly	<i>Syrirta pipiens</i>	Onion	Bulb			MEDIUM		
Two-spotted spider mite	Mite	<i>Tetranychus urticae</i> (red form) ¹²⁷	Onion	Bulb	HIGH	HIGH	LOW	LOW	VERY LOW
	Thri	<i>Thrips alliorum</i>	Onion	Foliage	HIGH	HIGH	MEDIUM	MEDIUM ¹²⁸	MEDIUM
Cabbage thrips ¹²⁹	Thri	<i>Thrips angusticeps</i>	Onion, garlic and leek	Whole plant	HIGH	HIGH	MEDIUM	MEDIUM ¹²⁸	MEDIUM
Onion thrips ¹³⁰	Thri	<i>Thrips tabaci</i> ¹³¹ (exotic strains/biotypes) ¹³²	Wide host range including onion, garlic, leek, shallot, horseradish, daisy, cotton and cucurbits	Foliage, bulb, flowers	HIGH ¹³³	HIGH	HIGH ¹³⁴	MEDIUM - HIGH ¹³⁵	MEDIUM - HIGH
Cabbage looper	Lep	<i>Trichoplusia ni</i>	Onion		MEDIUM	HIGH	HIGH	LOW	LOW
Jumping plant louse	Bug	<i>Trioza tremblayi</i>	Onion	Foliage				MEDIUM	
Black onion fly	Fly	<i>Tritoxa flexa</i>	Onion	Bulb			HIGH	MEDIUM	
Spotted cutworm	Lep	<i>Xestia c-nigrum</i>	Onions		MEDIUM	HIGH	MEDIUM	LOW	VERY LOW
Dagger nematode	Nem	<i>Xiphinema diversicaudatum</i>	Onion and leek	Roots	MEDIUM	HIGH	LOW	MEDIUM ¹²⁸	LOW
Elegant grasshopper	Loc	<i>Zonocerus elegans</i>	Onion		LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Variegated grasshopper	Loc	<i>Zonocerus variegatus</i>	Onion		LOW	MEDIUM	MEDIUM	LOW	VERY LOW
	Nem	<i>Zygotylenchus guevarai</i>	Onion		MEDIUM	MEDIUM	LOW	LOW	NEGLIGIBLE

¹²⁷ Red (carmine) form also referred to as *T. cinnabarinus* (Carmine spider mite). Some taxonomists consider *T. cinnabarinus* to be a form of *T. urticae* and others consider them to be distinct species.

¹²⁸ Potential vector of viruses

¹²⁹ Synonym: Field thrips

¹³⁰ Synonym: Potato thrips

¹³¹ Vectors viruses including *Iris yellow spot virus* which has limited distribution in Australia

¹³² *Thrips tabaci* are present in Australia, however there are more damaging strains/biotypes that are not currently present Australia

¹³³ Intercepted on imported plant products from 54 plant genera and 23 countries

¹³⁴ Distributed very long distances by wind and air currents

¹³⁵ In the US losses of 25-50% reported in onion crops. Total losses may occur in onions at the seedling stage. High impact on onion seed crops, with severe losses in seed production from *T. tabaci* feeding on flowers.

Pathogens

Table 27. Onion pathogen threat summary table

Gaps indicate insufficient information available to make an assessment of risk

Common name	Life form	Scientific name	Primary host	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Dieback ¹³⁶	Fun	<i>Ascochyta allii-cepae</i>	Onion	Leaf-tips causing leaf blotches and tip dieback	MEDIUM ¹³⁷	MEDIUM	MEDIUM	LOW	VERY LOW
Leaf blight ¹³⁸	Fun	<i>Botrytis squamosa</i>	Onion, Japanese bunching onion, Welsh onion, leek and garlic	Foliage, seeds	HIGH ¹³⁹	MEDIUM	HIGH	HIGH	HIGH
Withertip ¹⁴⁰	Fun	<i>Cercospora duddiae</i>	Onion, garlic and leek	Foliage	MEDIUM	MEDIUM	HIGH	MEDIUM ¹⁴¹	LOW
Neck rot	Fun	<i>Ciborinia allii</i>	Welsh onion, onion, Japanese bunching onion	Foliage	LOW	MEDIUM	MEDIUM	LOW	VERY LOW
Leaf spot ¹⁴²	Fun	<i>Cladosporium allii</i>	Onion, shallot, chive, garlic and leek	Foliage	HIGH	HIGH	HIGH	HIGH ¹⁴³	HIGH
Rhubarb crown rot	Bac	<i>Erwinia rhapontici</i> ¹⁴⁴	Rhubarb, wheat, onion, garlic, pea, pear, tomato and ornamentals	Stalks, bulb	HIGH ¹⁴⁵	HIGH ¹⁴⁶	MEDIUM	LOW ¹⁴⁷	LOW

¹³⁶ Synonym: Leaf tip blotch

¹³⁷ Seed borne

¹³⁸ Synonyms: Leaf rot/blast, Neck rot

¹³⁹ Detected at border on several occasions

¹⁴⁰ Synonym: Leaf spot of onion and garlic

¹⁴¹ Can cause significant damage however is susceptible to control by foliar fungicides

¹⁴² Synonym: Leaf blotch

¹⁴³ Disease has severe impact on the standing crop when it becomes prevalent, and it would be expected to establish particularly in southern growing areas

¹⁴⁴ Synonym: *Pectobacterium rhapontici*

¹⁴⁵ Interception at the border has occurred

¹⁴⁶ Suitable climate and hosts within Australia

¹⁴⁷ Onions are not a major host

Common name	Life form	Scientific name	Primary host	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Basal rot of onion	Fun	<i>Fusarium oxysporum</i> f.sp. <i>cepae</i>	Onion, garlic, shallot and spring onion	Bulb, roots	HIGH ¹⁴⁸	MEDIUM ¹⁴⁹	MEDIUM ¹⁵⁰	MEDIUM ¹⁵¹	LOW
Onion mite-borne latent potexvirus	Vir	<i>Onion mite-borne latent potexvirus</i>	Onion, shallot, rakkyo, leek and crow garlic	Whole plant	LOW ¹⁵²	MEDIUM ¹⁵³	MEDIUM ¹⁵⁴		
Onion yellows phytoplasma	Bac	Onion yellows phytoplasma	Onion	Foliage	LOW				
Pepper veinal mottle virus	Vir	<i>Pepper veinal mottle virus</i>	Bell pepper, chilli, tobacco, tomato, eggplant and onion	Foliage, dwarfing of whole plant	LOW	UNKNOWN	MEDIUM ¹⁵⁵	LOW	NEGLIGIBLE – VERY LOW
Leaf blight	Fun	<i>Phyllosticta allii</i>	Onion	Foliage			LOW ¹⁵⁶	HIGH ¹⁵⁷	
Bacterial leaf spot	Bac	<i>Pseudomonas syringae</i> pv. <i>porri</i> (exotic strains)	Onion, leek, spring onion, shallot and garlic	Foliage	LOW	LOW	LOW	MEDIUM	VERY LOW
Rusts	Fun	<i>Puccinia</i> spp.(exotic species)	<i>Allium</i> spp.	Foliage	HIGH	HIGH	HIGH	EXTREME	EXTREME
Shallot latent carlavirus	Vir	<i>Shallot latent carlavirus</i>	Onion, shallot, leek and garlic	Whole plant	LOW	LOW ¹⁵⁸	LOW ¹⁵⁸	MEDIUM	VERY LOW
Shallot mite-borne latent potexvirus	Vir	<i>Shallot mite-borne latent potexvirus</i>	Onion, shallot and crow garlic	Whole plant					
Shallot virus x	Vir	<i>Shallot virus x</i>							

¹⁴⁸ May enter undetected on bulb imports

¹⁴⁹ Can live for a long time in the soil

¹⁵⁰ Soil borne, would be spread through movement of commodity

¹⁵¹ Effects bulbs in both field and storage environments

¹⁵² May be imported in bulbs/plants for vegetative propagation

¹⁵³ Several hosts established in Australia

¹⁵⁴ Primary vector, *Aceria tulipae*, is present in Australia

¹⁵⁵ Vecteded by *Aphis gossypii*, *A spiraeicola*, *Myzus persicae*, *Toxoptera citricidus*

¹⁵⁶ Main discharge mechanism thought to be rain splash

¹⁵⁷ In Japan onion weight reduced by 70-80%

¹⁵⁸ Identified vector not present in Australia

Common name	Life form	Scientific name	Primary host	Affected plant part	Entry potential	Establishment potential	Spread potential	Economic impact	Overall risk
Shallot yellow stripe potyvirus	Vir	<i>Shallot yellow stripe potyvirus</i>	Onion, various <i>Allium</i> spp.	Whole plant	LOW	LOW		MEDIUM	
Sint-Jan's onion latent carlavirus	Vir	<i>Sint-Jan's onion latent carlavirus</i>	Onion, various <i>Allium</i> spp.	Whole plant				LOW	
Tomato black ring nepovirus	Vir	<i>Tomato black ring nepovirus</i>	Onion, shallot, top onion, leek and chives	Whole plant, seeds	MEDIUM ¹⁵⁹	LOW ¹⁶⁰	LOW ¹⁶⁰	LOW	NEGLIGIBLE
Welsh onion yellow stripe potyvirus	Vir	<i>Welsh onion yellow stripe potyvirus</i>	Onion, rakkyo, Japanese bunching onion, Welsh onion and crow garlic	Whole plant	MEDIUM			MEDIUM	
Xanthomonas leaf blight	Bac	<i>Xanthomonas axonopodis</i> pv. <i>allii</i>	Onion, garlic, leek, chives, shallot and Welsh onion	Foliage ¹⁶¹	HIGH ¹⁶²	MEDIUM ¹⁶³	HIGH ¹⁶⁴	MEDIUM ¹⁶⁵	MEDIUM

¹⁵⁹ May be transmitted in seed, large host range

¹⁶⁰ Requires *Longidorus* nematodes as vectors

¹⁶¹ Reduction of foliage leads to stunting of the plants and smaller bulbs. In severe outbreaks premature plant death is observed.

¹⁶² May be introduced on bulbs for planting from countries where bacteria occurs

¹⁶³ The disease is favoured by high temperatures (higher than 27°C) and severe outbreaks usually occur shortly (7 to 10 days) after a period of humid, rainy weather. Can survive between crops on weeds and crops such as dry bean, alfalfa and other legumes.

¹⁶⁴ Seed transmitted. Also spread by wind and irrigation. May be disseminated on plant material and clothes etc.

¹⁶⁵ In USA, yield reductions ranging from 10 to 50% have been observed. Seedling infection in tropical climates can result in crop failure.

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