Import of Asian ('Shandong') pear (*Pyrus pyrifolia* (Burm.) Nakai and *P. ussuriensis var. viridis* T. Lee) fruit from Shandong Province in the People's Republic of China

A review under existing import conditions for Ya pear (*Pyrus bretschneideri* Redh.) fruit from Hebei and Shandong Provinces

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AGRICULTURE, FISHERIES AND FORESTRY - AUSTRALIA

Foreword

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GLOSSARY OF TERMS AND ABBREVIATIONS

AFFA	Department of Agriculture, Fisheries and Forestry - Australia
ALOP	appropriate level of protection
AQIS	Australian Quarantine and Inspection Service
AQSIQ	State General Administration of the People's Republic of China for Quality Supervision and Inspection and Quarantine
Area	an officially defined country, part of a country or all or parts of several countries
Biosecurity Australia	a major operating group within the Commonwealth Department of Agriculture, Fisheries and Forestry - Australia. Biosecurity Australia protects consumers and animal and plant health, and facilitates trade, by providing sound scientifically based and cost effective quarantine policy
China	the People's Republic of China
CIQ SA	State Administration for Entry-Exit Inspection and Quarantine of People's Republic of China
Control (of a pest)	suppression, containment or eradication of a pest population
Endangered area	an area where ecological factors favour the establishment of a pest whose presence in the area will result in economically important loss
Entry (of a pest)	movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled
Entry potential	likelihood of the entry of a pest
Establishment	the perpetuation, for the foreseeable future, of a pest within an area after entry
Establishment potential	likelihood of the establishment of a pest
FAO	Food and Agriculture Organization of the United Nations
Fresh	not dried, deep-frozen or otherwise conserved
ICA	Interstate Certification Assurance
ICON	AQIS Import Conditions database
Introduction potential	likelihood of the introduction of a pest
Introduction	entry of a pest resulting in its establishment

IPPC	International Plant Protection Convention, as deposited in 1951 with FAO in Rome and as subsequently amended
ISPM	International Standard on Phytosanitary Measures
MAFF	Ministry of Agriculture, Forestry and Fisheries, Japan
National Plant Protection Organisation	official service established by a government to discharge the functions specified by the IPPC
Non-quarantine pest	pest that is not a quarantine pest for an area
NPQS	National Plant Quarantine Service
Official	established, authorised or performed by a National Plant Protection Organization
Official control (of a regulated pest)	the active enforcement of mandatory phytosanitary regulations and the application of mandatory phytosanitary procedures with the objective of eradication or containment of quarantine pests or for the management of regulated non-quarantine pests
Pathway	any means that allows the entry or spread of a pest
PBPM	Plant Biosecurity Policy Memorandum
Pest	any species, strain or biotype of plant, animal, or pathogenic agent, injurious to plants or plant products
Pest categorisation	the process for determining whether a pest has or has not the characteristics of a quarantine pest or those of a regulated non-quarantine pest
Pest free area	an area in which a specific pest does not occur as demonstrated by scientific evidence and in which, where appropriate, this condition is being officially maintained
Pest risk analysis	the process of evaluating biological or other scientific evidence to determine whether a pest should be regulated and the strength of any phytosanitary measures to be taken against it
Pest risk assessment	determination of whether a pest is a quarantine pest and evaluation of its introduction potential
Pest risk assessment (for quarantine pests)	evaluation of the probability of the introduction and spread of a pest and of the associated potential economic consequences
Pest risk management	the decision-making process of reducing the risk of introduction of a quarantine pest

Pest risk management (for quarantine pests)	evaluation and selection of options to reduce the risk of introduction and spread of a pest
Phytosanitary measure	any legislation, regulation or official procedure having the purpose to prevent the introduction and/or spread of quarantine pests
Phytosanitary regulation	official rule to prevent the introduction and/or spread of quarantine pests, by regulating the production, movement or existence of commodities or other articles, or the normal activity of persons, and by establishing schemes for phytosanitary certification
Quarantine pest	a pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled
Regulated non-quarantine pest	a non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party
South Korea	Republic of Korea
Spread	expansion of the geographical distribution of a pest within an area
Spread potential	likelihood of the spread of a pest
SPS	Sanitary and Phytosanitary
SPS Agreement	WTO Agreement on the Application of Sanitary and Phytosanitary Measures
Stakeholders	Government agencies, individuals, community or industry groups or organisations, whether in Australia or overseas, with an interest in the subject matter of an IRA/Review, including the proponent/applicant for a specific project
WTO	World Trade Organization

SUMMARY

Biosecurity Australia has reviewed the importation of fresh Asian ('Shandong') pear (*Pyrus pyrifolia* (Burm.) Nakai and *P. ussuriensis* var. *viridis* T. Lee) fruit from Shandong Province in the People's Republic of China under the existing policy for the importation of fresh Ya pear (*Pyrus bretschneideri* Redh.) fruit from Shandong and Hebei Provinces. This was possible because of the similar profile for quarantine pests shared by fresh Ya pear fruit and Asian pear species in Shandong Province and the management practices in place.

This Review includes the following sections:

- introductory information giving the scope and background to the access request and the pear industries in Shandong Province and Australia as well as the current quarantine requirements for the importation of fresh pear fruit from various countries;
- comparison of the Asian and Ya pear pests in China;
- discussion of the quarantine pests of concern for fresh Asian pear fruit from China; and
- proposed phytosanitary conditions for the importation of Asian pear fruit from Shandong Province in China.

This Review identified 139 pests associated with Ya and Asian pears in Shandong Province of which only 40 are considered to be on fresh pear fruit and of quarantine concern. However, only 25 of these quarantine pests are considered to be associated with fresh Asian pear fruit from Shandong Province.

The quarantine pests associated with fresh Asian pear fruit from Shandong Province are similar to those associated with fresh Ya pear fruit currently imported from Shandong Province. Therefore this Review recommends that fresh Asian pear fruit be permitted entry into Australia from Shandong Province under the same conditions currently in place for fresh Ya pear fruit imported from Hebei and Shandong Provinces.

In summary the conditions proposed for importation are:

- Permitted species/varieties from Shandong Province:
  Pyrus pyrifolia (Burm.) Nakai
  Pyrus ussuriensis var. *viridis* T. Lee.
- Asian pears will be subject to pre and post-harvest treatment and handling and management systems that limit the development and spread of pests of quarantine concern to Australia.
- Asian pears will be subject to joint pre-harvest and pre-clearance inspection by AQSIQ and AQIS.

1. SCOPE

Australia currently permits the importation of fresh Ya pears (*Pyrus bretschneideri* Redh.) from the People's Republic of China (Hebei and Shandong Provinces only), Nashi pears (*Pyrus pyrifolia* (Burm.) Nakai) from Japan, and Korean pears (*Pyrus ussuriensis* var. *viridis* T. Lee) from the Republic of Korea. Importation is permitted under the general conditions for all fresh fruit and vegetables. A combination of pest management, surveillance and monitoring are also required for China, Japan and Korea. In addition, pre-clearance by AQIS inspectors is required for fruit from China and Japan.

For the purpose of this assessment, the term 'Asian pear' and 'Shandong' pear are used interchangeably and refer specifically to fruit of *Pyrus pyrifolia* (Burm.) Nakai and *P. ussuriensis* var. *viridis* T. Lee that have been grown in Shandong Province under the same conditions as those for Ya pear (*P. bretschneideri* Redh.) from Hebei and Shandong Provinces in China.

This Review considers the quarantine risks that may be associated with the importation into Australia of fresh Asian pear fruit for consumption from Shandong Province in China. The Review also considers and evaluates measures and procedures to manage these risks to an acceptably low level, which is consistent with Australia's appropriate level of protection (ALOP).

The implementation of any acceptable protocol will be made through the laws and regulations as well as the agricultural policies of both contracting parties. The pear fruit covered by this Review are *P. pyrifolia* (Burm.) Nakai and *P. ussuriensis* var. *viridis* T. Lee, as requested by China. In this Review, pear fruit is defined as a mature fruit of *Pyrus* spp.

In completing this Review, the pest list of Ya pears from Hebei and Shandong Provinces is compared with the pest list of Asian pears from Shandong Province. Biosecurity Australia acknowledges the assistance of the State General Administration of the People's Republic of China for Quality Supervision and Inspection and Quarantine (AQSIQ) for assistance in providing information and pest lists.

2. BACKGROUND

China currently has four commodities, longans and lychees, pears, apples, and peaches on the Plant Biosecurity Import Access Proposal list.

Ya pear

The Australian Quarantine and Inspection Service (AQIS) received an application from China in April 1991 seeking market access for Ya pear (*P. bretschneideri* Redh.) fruit from Hebei and Shandong Provinces in China into Australia. China provided more information on pests and diseases in 1994 and in 1996.

AQIS circulated a discussion paper, which summarised the import risk analysis (IRA), and proposed import conditions to stakeholders in July 1997 in accordance with the

Australian Government's quarantine policy. The final IRA was released in January 1999.

AQIS provided CIQ SA (now AQSIQ) with an 'Arrangement document', which outlined the phytosanitary requirements for the importation of Chinese Ya pear fruit into Australia, on 26 March 1999. An AQIS officer visited Hebei Province in China in September 1999 to conduct the pre-clearance inspection prior to commencement of trade. Trade in Ya pear from Hebei Province commenced in October 1999.

In the first season of trade up to the end of January 2000, approximately 1,205 tonnes of Ya pear fruit (82,501 cartons or 62 container loads) were imported into Australia.

After the first year of trade, China indicated that they wished to extend the export of Ya pears to Shandong Province. AQSIQ provided BA with technical information and data to support Shandong Province as a designated source of export fruit on 23 August 2000. BA agreed in principle to permit imports of Ya pear fruit from Shandong Province subject to the same phytosanitary conditions as Hebei Province. These conditions are outlined in the final IRA for the importation of fruit of Ya pear (*Pyrus bretschneideri* Redh.) from the People's Republic of China (Hebei and Shandong Provinces) (Section 6-Phytosanitary Requirements: Items 1 – 8). Trade commenced from Shandong Province in October 2000.

In accordance with the final Ya pear IRA, BA was planning to review the import conditions at the end of the first export season, but with the extension of the designated export areas to include Shandong, the review was commenced at the end of the second year of trade so as to cover both regions.

On 23 January 2003, BA completed a review on the current import conditions for all existing pome fruit imports from north Asia. This review removes the need for petal testing and flower cluster examination at blossoming for Nashi pear and Fuji apple from Japan, Korean pear from Korea, and Ya pear from China. The amended import conditions will come into effect in the 2003 season.

Asian pear

China believed that access for Ya pears from Shandong would encompass all types of pears from Shandong. However, Ya pear (*P. bretschneideri*) and 'Shandong' pears (*P. pyrifolia* and *P. ussuriensis* var. *viridis*) are actually different species and not merely varieties of the same species, and therefore required assessment by BA.

At the China-Australia bilateral meeting held in Beijing in March 2001, AQSIQ requested access for 'Shandong' pears from Shandong Province for the 2001 season by providing a pest and disease list and details of pest management practices for 'Shandong' pear.

After a preliminary comparison of the Chinese pest lists, BA requested additional information from AQSIQ in April 2002 on some pests of 'Shandong' pear which were not assessed in the IRA on Ya pear from Hebei and Shandong Provinces.

Biosecurity Australia issued a Plant Biosecurity Policy Memorandum (PBPM) 2002/26 on 19 June 2002 advising stakeholders of the import request for 'Shandong' pear from China and BA's intention to evaluate whether the request could be assessed

as an extension of the existing policy for Ya pear from Hebei and Shandong Provinces.

AQSIQ provided information on the additional pests in July 2002, followed by the reports on management programs and test results for export pears from Shandong Province in September and October 2002. A plant pathologist from BA visited current and potential export orchards for pears in Shandong Province and assessed that the import proposal for Asian pears from Shandong Province could be considered as an extension of the existing policy for Ya pear from Hebei and Shandong Provinces.

On 11 October 2002, BA notified AQSIQ that a review was being conducted to consider the future importation of Asian pears from Shandong Province.

2.1 The pear industry in Australia

The Australian pear industry is smaller than the apple industry, supplying both domestic and export markets. Australia produces, on average, around 169,000 tonnes of pears each year (ABS 2002; APAL 2002). Around 40% of the Australian pear crop is consumed on the fresh domestic market, 45% is processed, and the remaining 15% is exported (FAS, 2002b). Australia's production represents 1.4% of the world production of pears (APAL, 2002). The estimated fresh farm gate value of the combined apple and pear industry is around $499 million (ABS Year Book, 1999).

The main varieties of the traditional European pears (*Pyrus communis*) grown commercially in Australia are Packham's Triumph, Williams Bon Chretin (WBC, also called Bartlett and Duchess) and Buerre-Bosc, which make up 92% of production (APAL, 2002). WBC is the major canning variety but is also popular as a fresh eating variety early in the season. Packham's Triumph is grown for the fresh market and is the main variety exported from Australia (FAS, 2002; Mitchelmore and Morenos, 1995). Other varieties of significance cultivated in Australia are Josephine de Malines, Winter Nelis and Sensation (red variety). Of lesser significance are Clapp's Favourite, Winter Cole, Lemon Bergamot and Doyenne du Comice.

Asian pears, known in Australia as Nashi pears (*Pyrus pyrifolia* or *P. ussuriensis*), were established as a horticultural industry during the 1980's. In 1997-98 the Nashi pear industry produced about 7,000 tonnes of pears with an estimated farm gate value of $20 million. About 80% are consumed fresh with the remainder processed mostly for juice. The main variety is Nijisseiki (90%) with some Hosui and Kosui (Coombs 1995) and Shinsui, although additional introduced and new varieties are under trial and development.

2.1.1. Pear production in Australia

Pear fruit is grown commercially in all states except the Northern Territory. Table 1 summarises the Australian pear production and processing per state for 2001 (excluding Nashi pear). Most of Australia's pear production comes from Victoria with 149,000 tonnes (88%) in 2001 (APAL, 2002). Followed by Western Australia with 6.9%, South Australia 3.4%, New South Wales 0.8%, Queensland 0.5% and Tasmania 0.3%. Victoria has the most pear trees and the highest level of production in Australia.

Table 1. Australia's pear production for 2000-01 (excluding Nashi pear)

State	Production (tonnes)	% of Total	Processing (tonnes)
Victoria	148,807	88.1	70,350
Western Australia	11,574	6.9	2,681
South Australia	5,804	3.4	521
New South Wales	1,348	0.8	222
Queensland	864	0.5	156
Tasmania	499	0.3	41
Total	**168,896**	**100**	**73,971**

Source: ABS (2002) and APAL (2002)

The main growing areas are located in regions with mild summer temperatures and cool to cold winters. These include: the Goulburn Valley in Victoria; Orange and Batlow in New South Wales; Stanthorpe in southern Queensland; the Perth Hills, Donnybrook and Manjimup in Western Australia; the Adelaide Hills in South Australia; and Spreyton, Huon Valley and the Tamar Valley in Tasmania.

The largest number of pear growers are in the Goulburn Valley region of Victoria, with 3,000 hectares of orchards. There are around 140 pear growers in southern Victoria.

The Goulburn Valley area of Victoria also produces 80% of Australia's Nashi pears with the rest coming from Young in New South Wales, the Adelaide Hills in South Australia and at Donnybrook in Western Australia. There are about 65 Nashi pear growers with 300,000 trees in 500 hectares of orchards (HAL, 2003).

2.1.2. Exports of pears from Australia

Fresh pears are the second most valuable Australian horticultural export product after oranges (Morenos, 1997). The value of pear exports almost doubled from $18.8 million in 1988-1989 to $33.6 million in 1992-93. However, exports of fresh pears have varied considerably during the past decade ranging from 20,000 – 35,000 tonnes annually.

South-east Asia is the main outlet for Australian pear exports including Singapore, Malaysia, Indonesia and Hong Kong (Morenos, 1997). The European Union is also an important market. Nashi pears are exported to these and other Asian markets.

2.1.3. Imports of pears into Australia

Nashi pears have been exported to Australia from Japan since 1989, and Korean pears from South Korea and Ya pears from China since 1999. The import volumes are given in Table 2. To date no quarantine pests of concern to Australia have been intercepted on fruit imported from all three countries.

Table 2. Import volumes (tonnes) for pears from China, Japan and Korea

Year	Ya pear China	Nashi pear Japan	Korean pear Korea
1999-00	1,204	71	15
2000-01	2,620	28	12
2000-02	1,552	10	17

2.2 The Asian pear industry in China

China is the world's leading Asian pear producing country. Cultivated pears in China are classified into four groups:

Pyrus bretschneideri (white pear) is mainly grown in northern China, Hebei, Shandong and Liaoning provinces and accounts for 60% of pear production in the country (Zai-Long, 1999). A great number of cultivars exist in this group; some of these cultivars, notably Ya-Li, Xue-hua-li, Lai-yang-ci-li and Dong-guo-li produce fruits of excellent quality with crispy, juicy and sweet flesh and relatively few stone cells.

Pyrus pyrifolia (sand or apple pears) grow almost wild in the Yangtze River valley. They adapt well to wet and high summer temperatures and the popular cultivars Cang-xi-li and Bao-zhu-li are locally important cultivars. Huang-hai-li and Jin-shu 2 are newly developed cultivars and are extensively used in new plantings. The Japanese cultivars also belong to the sand pear category. Some Japanese cultivars such as New Century, Kosui and Shin sui are also important cultivars in this area.

Fruits of white pear and sand pear are juicy, crisp and sweet. They do not require ripening after harvest and can be used as a dessert fruit immediately after picking.

Pyrus ussuriensis (Ussurian pear) is the most hardy of all *Pyrus* species and is grown in the areas north of the Great Wall, especially in northeast China. In general, fruit quality of the cultivars derived from this species are very much inferior to those of the white pear and sand pear. The fruits are usually smaller and require a period of post-harvest ripening to become edible. After proper ripening they become soft with a strong aroma and acceptable quality. Representative cultivars of this group are An-li, Da-xiang-shui-li, Nan-guo-li and Jing-bei-li.

Pyrus communis (European pear, fragrant pear) is not commonly found in China and it is only grown to a limited extent in a few localities (Zai-Long, 1999).

2.2.1. Asian pear production in China

China's pear production has increased steadily during the last 10 years, the result of extensive planting during the 1980's and early 1990's. In 1999, the total production of fresh pears amounted to 7.74 million metric tonnes (China Fruit News, 2000). Pear production in China was predicted to increase 5% in 2001-02 to a record 8.8 million tonnes (FAS, 2002a). However, the big increases in fruit production and acreage are not expected to continue, mainly because of prevailing lower prices.

China's pear crops cover an area of 924,000 ha with a production of 6,415 million tonnes a year (Zai-Long, 1999). The pear crop constitutes 10.6% of the total deciduous fruit crop area, and production is 12.6% (Zai-Long, 1999). Ya pears or duck pears are the most popular variety grown in China, accounting for about 30% of production (FAS, 2002a). Other important varieties include Su, Xuehua, and Pingguo pears. Other pear varieties include snow pear and Shandong pears.

China's major pear producing centres are Hebei and Shandong provinces. Figure 1 shows the location of Shandong and Hebei Provinces in the north-east of China.

Figure 1. Map of China showing Hebei and Shandong Provinces

Hebei is the leading pear-producing province, accounting for a third of the total Chinese pear crop (FAS, 2002a). It is estimated that Hebei and Shandong produce around 1.2 million tonnes and 900,000 tonnes of pears each year respectively (China Fruit News, 2002).

Table 3 summarises the pear area and production for the export orchards in Shandong Province. There are a total of 39 registered pear orchards and packing houses for export fruit in Shandong Province (CIQ SA, 2001).

Table 3. China's Asian pear area and production for export orchards in Shandong Province

Name of Export Orchard		Registered orchards & Packing houses	Area (ha)	Production (tonnes)
Yangxin County	Yangxin Town	12	340.7	511
	Yingao Town	5	133.3	200
Guan County		8	1040	1248
Longkou City	Tianjia Town	5	400	240
	Wenji Town	4	166.7	240
	FHTK Orchard Base	5	218.2	1277.4
TOTAL		**39**	**2298.9**	**3716.4**

Source: CIQ SA (2001)

2.2.2. Exports of pears from China

China currently exports pear fruit (*Pyrus* spp.) to the United States of America, Canada, Australia, New Zealand, Russia, and countries in south-east Asia.

China's pear exports were forecast to increase to more than 167,000 tonnes in 2001-02, mainly as a result of a larger crop (FAS, 2002a). Pear shipments from China have increased considerably in recent years and are becoming more important to Chinese pear growers. China exported about 141,000 tonnes of pears in 2000-01, compared to practically nothing 10 years ago (FAS, 2002a). Fruit quality in China continues to improve, contributing to the expansion of China's exports to south-east Asian countries and Russia.

2.3 Current Australian quarantine protocols for pear imports

The current Australian quarantine protocols for pear imports are as follows:

All countries are required to comply with the "*General requirements for all fruit and vegetables*" detailed below.

1. A permit is required.
2. A phytosanitary certificate must accompany each consignment.
3. A Quarantine Entry form should be lodged for produce from sea and airfreight by an importer or their agent for clearance of the consignment by AQIS.
4. Shipments must be free of soil and other debris and packed in clean new packages.
5. All consignments (other than those pre-cleared in the country of origin under an arrangement approved by AQIS) are subject to inspection on arrival and any treatment necessary before release.

6. Inspection must occur at the first port of call. No land bridging of consignments will be permitted unless the goods have cleared quarantine.
7. All consignments treated prior to export must have a commercial treatment certificate or a valid endorsement on the phytosanitary certificate or as otherwise stated in the specific conditions.
8. Open (door ajar) dry boxes that are used to ship produce that requires airing during transport are acceptable provided the containers are secured by replacing or closing the door prior to movement from the wharf to the site of inspection. Alternative security can be provided by security meshing, screening or covering with a heavy plastic sheet or tarping over the open containers.
9. Timber packing, pallets or dunnage in Full Container Load (FCL) containers will be subjected to inspection and treatment on arrival, unless certified as having been treated by an approved method.

2.3.1. China

Australia has an 'Arrangement document' with China which specifies that fresh pear fruit imported from China must be precleared by AQIS. The preclearance arrangement is contingent upon the State General Administration of the People's Republic of China for Quality Supervision and Inspection and Quarantine (AQSIQ) providing BA with satisfactory details of pest surveillance activities obtained during the growing season. No import permits will be approved until the required information has been forwarded to BA and approval given for AQIS to proceed with preclearance each season.

The general requirements for precleared fresh fruit includes the following:

1. An import permit application is required to be lodged with AQIS Canberra Office at least one month prior to preclearance inspection commencing.
2. A Phytosanitary Certificate must accompany each consignment.
3. A Quarantine Entry form should be lodged for produce from sea and air freight by an importer or their agent for clearance of the consignment by AQIS.
4. All costs associated with the preclearance of fresh fruits and vegetables must be borne by industry, either in the exporting country or by agreement by the importer/s. Preclearance costs include (but are not necessarily restricted to) international and domestic travel, accommodation, meal allowance, inspection costs (ie. fee for service), departure taxes and miscellaneous expenses.
5. Shipment must be free of soil and other debris and packed in clean new packages.
6. Produce precleared in the country of origin is not subject to AQIS inspection on arrival in Australia, but may be subject to random monitoring by AQIS to verify container/consignment content and integrity.
7. Timber packaging, pallets or dunnage in FCL containers will be subject to inspection and treatment on arrival, unless certified as having been treated by an approved method.

Each consignment must be accompanied by a Phytosanitary Certificate endorsed "Produced and inspected under the Ya pear arrangement between CIQ and AQIS".

The Phytosanitary certificate must also include the following information:

1. The pre-cleared lot numbers in the consignment.
2. The number of cartons in each pre-cleared lot.
3. The shipping container number/s.
4. The shipping container seal number/s issued by CIQ.
5. No part of the consignment will be landed in Western Australia either before or after being cleared from quarantine in Australia.
6. A copy of the relevant CIQ "Master Phytosanitary Certificate/s" must also accompany each consignment (ie. attached to the individual consignment Phytosanitary Certificate).

2.3.2. Japan

Australia has an 'Arrangement document' with Japan which specifies that fresh pear fruit imported from Japan must be precleared by AQIS. The preclearance arrangement is contingent upon the Ministry of Agriculture, Forestry and Fisheries, Japan (MAFF) providing BA with satisfactory details of pest surveillance activities obtained during the growing season. No import permits will be approved until the required information has been forwarded to AQIS and approval given to proceed with preclearance each season.

1. An import permit application is required to be lodged with AQIS Canberra Office at least one month prior to preclearance inspection commencing.
2. A Phytosanitary Certificate must accompany each consignment.
3. A Quarantine Entry form should be lodged for produce from sea and air freight by an importer or their agent for clearance of the consignment by AQIS.
4. All costs associated with the preclearance of fresh fruits and vegetables must be borne by industry, either in the exporting country or by agreement by the importer/s. Preclearance costs include (but are not necessarily restricted to) international and domestic travel, accommodation, meal allowance, inspection costs (ie. fee for service), departure taxes and miscellaneous expenses.
5. Shipment must be free of soil and other debris and packed in clean new packages.
6. Produce precleared in the country of origin is not subject to AQIS inspection on arrival in Australia, but may be subject to random monitoring by AQIS to verify container/consignment content and integrity.
7. Timber packaging, pallets or dunnage in FCL containers will be subject to inspection and treatment on arrival, unless certified as having been treated by an approved method.

Each consignment must be accompanied by a Phytosanitary Certificate endorsed "Produced and inspected under the agreement between MAFF and AQIS". The following import conditions also apply:

1. A copy of the MAFF "Master Phytosanitary Certificate" for the current season must also accompany each consignment.
2. Fruit cartons must be labelled with "for Australia" and the orchard number, packing shed number and date of packing. Packages must be sealed with a single MAFF seal between lid and base of carton.
3. MAFF to apply door seals to the containers in Tottori and again after Customs verification after Customs inspection in Kobe and ensure that the container number is correctly endorsed on the Phytosanitary Certificate.

2.3.3. South Korea

Each consignment must be accompanied by a Phytosanitary certificate endorsed "Produced and inspected under the Korean pear arrangement between NPQS and AQIS".

Each Phytosanitary certificate must also include the following information:

1. The lot number/s included in the shipment.
2. The number of cartons from each lot inspected by NPQS.
3. The shipping container number/s.
4. The shipping container seal number/s issued by NPQS.

Each carton of Korean pears must be marked with the following information:

1. "For Australia".
2. Orchard registration number (issued by NPQS).
3. Packing house registration number (issued by NPQS).
4. Date of packing.

3. CONSIDERATIONS

3.1 Comparison of pear pests in Shandong Province on Ya (*Pyrus bretschneideri* Redh.) and Asian pear species (*Pyrus pyrifolia* (Burm.) Nakai and *P. ussuriensis* var. *viridis* T. Lee)

A pest list for Asian pears from Shandong Province in China is detailed in Appendix 1. The pests associated with Ya pears from Hebei and Shandong Provinces in China has been copied from the final Ya pear IRA and is included in Appendix 2. The majority of the pests that were identified as being associated with fresh Ya pear fruit from Hebei and Shandong Provinces in China were also associated with Asian pears.

Table 4 summarises the total number of pests known to be associated with Ya and Asian pear orchards in China (Shandong Province) for each pest type (arthropods, nematodes, bacteria and fungi). Of the total 139 pests known on Ya and Asian pear trees in China (Shandong Province), 64 are common to both Ya and Asian pears, 56 are found only on Ya pears, and 19 are found only on Asian pears.

Table 4. Summary of potential pests associated with pears in China (Shandong Province)

Organism type	Associated with pears in China	Pests common to Ya & Asian pears	Associated with Ya pear only	Associated with Asian pear only
Arthropods	106	51	45	10
Nematodes	1	0	0	1
Bacteria	2	1	0	1
Fungi	30	12	11	7
Total	**139**	**64**	**56**	**19**

Table 5 summarises the number of potential pests associated with pear orchards in China (Shandong Province) and their presence in Australia. Of the total 139 potential pests associated with pears in China, 31 are recorded as present in Australia and did not require further consideration. The remaining 106 pests not present in Australia plus the two arthropod pests present in Australia but under official control, required further consideration.

Table 5. Number of potential pests associated with pears in China (Shandong Province) and in Australia

Organism type	Associated with pears in China	Present in Australia	Present in Australia, but under official control	Not present in Australia
Arthropods	106	16	2	88
Nematodes	1	0	0	1
Bacteria	2	1	0	1
Fungi	30	14	0	16
Total	**139**	**31**	**2**	**106**

Table 6 summarises the number of pests on the import pathway (fresh fruit) that are of quarantine concern to Australia.

Table 6. Number of pear pests of quarantine concern to Australia

Organism type	Not present in Australia or present in Australia, but under official control	On import pathway (fruit)	Number of quarantine pests
Arthropods	90	32	32
Nematodes	1	0	0
Bacteria	1	1	1
Fungi	16	7	7
Total	**108**	**40**	**40**

Of the 90 arthropod pests not present in Australia or present but under official control, 32 are associated with the pear fruit pathway and of quarantine concern. This includes the two arthropod pests *Grapholita molesta* (Oriental fruit moth) and *Panonychus ulmi* (European red spider mite) present in Australia but under official control in some states. The nematode is not on the fruit pathway and therefore is not considered further. The bacterium, *Erwinia amylovora* (fire blight) is not present in Australia and is associated with the fruit pathway and is considered to be of quarantine concern. Of the 16 fungi not present in Australia, seven are on the fruit pathway and of quarantine concern. A total of 40 pests on fresh fruit of pear species from Shandong Province in China are considered to be of quarantine concern to Australia. These pests are listed in Table 7.

4. QUARANTINE PESTS OF CONCERN FOR FRESH ASIAN PEAR (*PYRUS PYRIFOLIA* (BURM.) NAKAI AND P. *USSURIENSIS* VAR. *VIRIDIS* T. LEE) FRUIT EXPORTS FROM SHANDONG PROVINCE

The Asian pear pest list from Shandong Province provided by AQSIQ contained a number of potential pests not covered in the Ya pear IRA. However, further investigations revealed that these pests were not present on the importation pathway (fresh fruit) and were not considered further in the risk assessment.

There was considerable overlap of arthropod and fungal pests between the Ya pear and Asian pear lists, and the quarantine risk of pests of fresh Asian pear fruit were similar to those identified in the Ya pear IRA. All 25 pests identified to be of quarantine concern on Asian pears have already been considered in the Ya pear IRA. These include 18 arthropod, one bacterium and six fungal species (shown in bold in Table 7).

Table 7. Pests of quarantine concern on all pears (*Pyrus bretschneideri*, *P. pyrifolia* and *P. ussuriensis* var. *viridis*) in China (Shandong Province) (pests on Asian pear in bold)

Scientific name	Common name
Arthropods	
Acleris fimbriana (Thunberg & Becklin)	Fruit tree tortrix
Acrobasis pyrivorella* (Matsumura) (syn. = *Ectomyelois pyrivorella*; *Numonia pirivorella	**Pear fruit moth**
***Adoxophyes orana* (Fischer von Röslerstamm)**	**Summer fruit tortrix**
***Aphanostigma iakusuiensis* (Kishida)**	**Powdery pear phylloxera**
Bactrocera dorsalis (Hendel)	Oriental fruit fly
Cacopsylla pyrisuga (Forster)	Pear wood psylla
***Carposina sasakii* Matsumura (syn. = *Carposina niponensis*)**	**Peach fruit moth**
Cydia inopinata (Heinrich)	Manchurian fruit moth
Dolycoris baccarum Linnaeus	Sloe bug
Euzophera pyriella Yang	Moth
***Grapholita molesta* (Busck)**	**Oriental fruit moth**
***Halyomorpha picus* (Fabricius)**	**Tree stink bug**
Holotrichia parallela (Motschulsky)	Large black chafer
Holotrichia titanis Reitter	Brown chafer
***Hoplocampa pyricola* Rohwer**	**Pear sawfly**
Hoshinoa longicellana (Walsingham)	Common apple leafroller
***Leucoptera malifoliella* (Costa)**	**Pear leaf blister moth**
Lopholeucaspis japonica (Cockerell)	Pear white scale
***Lymantria dispar* (Linnaeus)**	**Gypsy moth**
***Pandemis heparana* (Denis & Schiffermüller)**	**Apple brown tortrix**
***Panonychus ulmi* (Koch)**	**European red spider mite**
***Pseudococcus comstocki* (Kuwana)**	**Comstock mealybug**
Rhynchites coreanus Kono	Pear leaf weevil
***Rhynchites foveipennis* Fairmaire**	**Korean pear weevil**
Spilonota albicana Motschulsky	Large apple fruit moth
***Spilonota lechriaspis* Meyrick**	**Bud moth**
Spilonota ocellana (Denis & Schiffermüller)	Moth
***Spulerina astaurota* (Meyrick)**	**Pear barkminer**
***Stephanitis nashi* Esaki & Takeya**	**Nashi lace bug**
***Tetranychus viennensis* Zacher**	**Hawthorn red spider mite**
***Urochela luteovaria* Distant**	**Pear stink bug**
Vespa mandarinia Smith	Paper wasp
Bacteria	
***Erwinia amylovora* (Burrill) Winslow *et al*.**	**Fire blight**
Fungi	
***Alternaria gaisen* Nagano**	**Black spot**
Botryosphaeria berengeriana* f.sp. *piricola	**Physalospora canker**
***Gymnosporangium asiaticum* Miyabe ex G. Yamada**	**Japanese pear rust**
***Monilinia fructigena* Honey**	**Brown rot**
***Phomopsis fukushii* Tanaka et Eudo**	**Phomopsis canker**
***Valsa ambiens* (Pers. : Fr.) Fr.**	**Valsa canker**
Venturia nashicola Tanaka & Yamamoto	Pear scab

The arthropod pests of quarantine concern on Asian pears from Shandong Province can be managed using the risk management measures in the Ya pear IRA. These

include orchard control measures (orchard registration, pest surveillance and management programs, and bagging of fruit) and joint pre-harvest and pre-clearance inspections.

An updated datasheet on *Acrobasis pyrivorella* (pear fruit moth) has been included in Appendix 3 due to the confusion over its valid taxonomic name (= *Ectomyelois pyrivorella* Matsumura; *Numonia pirivorella* Matsumura in the Ya pear IRA).

The bacterium *Erwinia amylovora* (fire blight) of quarantine concern on Asian pears from Shandong Province can be managed using the measures in the Ya pear IRA. These include detection surveys and area freedom in Hebei and Shandong Provinces.

The fungal pests of quarantine concern on Asian pears from Shandong Province can be managed using the risk management measures in theYa pear IRA as stated above, with additional monitoring and detection surveys for fungal pests of quarantine concern to Australia.

5. PROPOSED PHYTOSANITARY CONDITIONS FOR THE IMPORTATION OF ASIAN PEARS (*PYRUS PYRIFOLIA* (BURM.) NAKAI AND P. *USSURIENSIS* VAR. *VIRIDIS* T. LEE) FROM CHINA

Biosecurity Australia proposes the following phytosanitary conditions to address the risks posed by the quarantine pests identified on Asian pears. These conditions are detailed in Appendix 4 and follow the amended Ya pear fruit from China to Australia requirements in the *Review of the Australian Requirement for Petal Testing and Flower Cluster Examination at Blossoming for Pome Fruit from Japan, The Republic of Korea and The People's Republic of China* released by BA in January 2003.

It is a condition of entry that AQSIQ immediately advise BA and AQIS of any outbreak or change of status of the pests detailed in Table 7 in the pear production areas of Shandong Province.

5.1 Summary of the import conditions for fresh Asian pear (*Pyrus pyrifolia* (Burm.) Nakai and P. *ussuriensis* var. *viridis* T. Lee) fruit from Shandong Province

- The following *Pyrus* species/varieties would be permitted from Shandong Province:

  Pyrus pyrifolia (Burm.) Nakai
  Pyrus ussuriensis var. *viridis* T. Lee

- Asian pears will be subject to pre and post-harvest treatment and handling and management systems that limit the development and spread of pests of quarantine concern to Australia.

- Asian pears will be subject to joint pre-harvest and pre-clearance inspection by AQSIQ and AQIS.

6. REFERENCES

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7. APPENDICES

APPENDIX 1: PESTS ASSOCIATED WITH ASIAN PEARS FROM CHINA (SHANDONG PROVINCE)

Shaded text indicates the species was also considered under the same name or indicated synonym in the Ya pear IRA

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Arthropoda							
Acrobasis pirivorella (Matsumura) Syn. = *Nephopteryx pirivorella* Matsumura, 1900; *Nephopteryx pyrivorella* (Matsumura); *Acrobasis pyrivorella* (Matsumura); *Ectomyelois pirivorella* (= *pyrivorella*) (Matsumura); *Eurhodope pirivorella* (Matsumura); *Myelois pirivorella* (Matsumura); *Nephopterix pirivorella* (Matsumura); *Numonia pyrivora* Gerasimov; *Numonia pirivora* (Gerasimov); *Numonia pyrivorella* (= *pirivorella*) (Matsumura); *Rhodophaea pirivorella* (Matsumura)	Pear fruit moth; large pear fruit borer; pear moth; pear pyralid; pear driller	Lepidoptera: Pyralidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	Yes – flower buds, young and maturing fruit (AQSIQ, 2002; CABI/EPPO, 1997c)	**Yes**
Acronicta (*Triaena*) *intermedia* (Warren, 1909) Syn. = *Acronicta increta* Butler, 1878; *Acronicta incretata* Hampson, 1909; *Acronicta jezoensis* Matsumura, 1926; *Acronicta formosensis* Matsumura, 1928; *Triaena intermedia* (Warren)	Apple dagger moth	Lepidoptera: Noctuidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – leaf (Ahn *et al*., 1989)	
Acronicta rumicis (Linnaeus, 1758) Syn. = *Acronicta alnoides* Geest,	Sorrel cutworm; knotgrass moth	Lepidoptera: Pyralidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – leaf (AQSIQ, 2002)	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
1903; *Phalaena rumicis* Linnaeus, 1758; *Phalaena Noctua rumicis* Linnaeus, 1758; *Acronicta grisea* Warren, 1913; *Acronicta marginata* Lambillion, 1909; *Acronicta striata* Meves, 1914; *Acronicta suhrianna* Gillmer, 1907; *Acronicta tugubris* Schultc, 1902; *Acronycta bercei* Saunders, 1870; *Acronycta diffusa* Walker, 1857; *Acronycta rumicis* ssp. *pallida* Rothschild, 1920; *Acronycta rumicis* ssp. *rumicina* Bryk, 1949; *Acronycta rumicis* var. *turanica* Staudinger, 1888; *Acronycta salicis* Curtis, 1826; *Apatele rumicis* (Linnaeus); *Apatele rumicis* ssp. *oriens* Inoue & Sugi, 1958; *Pharetra rumicis* (Linnaeus)							
Actias selene ningpoana Felder & Felder, 1862	Green Actias moth	Lepidoptera: Saturniidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – leaf (He *et al*., 1991)	
Adoxophyes orana (Fischer von Röslerstamm, 1834) Syn. = *Tortrix orana* Fischer von Röslerstamm, 1834; *Adoxophyes reticulana* Hübner; *Capua reticulana* Hübner; *Cacoecia reticulana* (Hübner); *Capua orana*; *Tortrix reticulana* (Hübner); *Capua congruana* (Walker); *Adoxophyes tripsiana*; *Adoxophyes fasciata* Walsh; *Acleris reticulana* (Hübner); *Adoxophyes congruana* Walker	Summer fruit tortrix smaller apple leaf roller; apple peel tortricid; reticulated tortrix; smaller tea tortrix	Lepidoptera: Tortricidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	Yes – fruit, leaf, shoot (Alford, 1984; Dickler, 1991)	**Yes**
Anomala corpulenta Motschulsky	Blue chafer; copper green chafer	Coleoptera: Scarabaeidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – leaf (CAPQ, 1996); root (Luo *et al*., 1987)	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Anuraphis piricola Okamoto & Takahashi Syn. = *Anuraphis artemirhizus*; *Sappaphis piri* Matsumura, 1918	Pear round-tailed aphid	Hemiptera: Aphididae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – bud, leaf (CAPQ, 1996)	
Aphanostigma iakusuiense (Kishida) Syn. = *Cinacium iakusuiensis*	Pear phylloxera; powdery pear aphid	Hemiptera: Phylloxeridae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	Yes – fruit (CIQ SA, 2001)	**Yes**
Aphis spiraecola Patch, 1914 Syn. = *Anuraphis erratica* del Guercio, 1917; *Aphis bidentis* Theobold, 1929; *Aphis citricola* Van der Goot, 1912; *Aphis croomiae* Shinzi, 1922; *Aphis deutziae* Shinji, 1922; *Aphis malvoides* Van der Goot, 1917; *Aphis mitsubae* Shinji, 1922; *Aphis nigricavda* Van der Goot, 1917; *Aphis pirifoliae* Shinji, 1922; *Aphis pseudopomi* Bertels, 1973; *Aphis pseudopomi* Blanchard, 1939; *Aphis virburnicolens* Swain, 1919	Green citrus aphid; apple aphid; spiraea aphid	Hemiptera: Aphididae	Yes – (CABI/EPPO, 2001; CIQ SA, 2001)	Yes – NSW, QLD, SA, TAS, VIC (CABI/EPPO, 2001)	Non-quarantine	Yes – flower, fruit, vegetative parts (Smith *et al*., 1997); bud, leaf (CAPQ, 1996)	
Apocheima cinerarius Ershov. Syn. = *Apocheima cinerarium piri* Yang; *Apocheima cinerarius pyri* Yang; *Biston cinerarius* Ershov.	Pear geometrid; mulberry geometrid; poplar looper	Lepidoptera: Geometridae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – bud, leaf (CAPQ, 1996)	
Apriona germari (Hope, 1831) Syn. = *Apriona rugicollis*	Mulberry longicorn; brown mulberry longicorn beetle; longhorn stem borer	Coleoptera: Cerambycidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – bark, branch, shoot, trunk (Sharma & Tara, 1985); branch, leaf, stem, twig (CAPQ, 1996)	
Bacchisa fortunei (Thomson) Syn. = *Chreonoma fortunei*	Pear borer; blue longicorn beetle	Coleoptera: Cerambycidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – leaf, stem (CAPQ, 1996)	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Blastodacna pyrigalla (Yang, 1977) Syn. = *Sinitinea pyrigalla* Yang, 1977; *Sinitinea pyrigolla* (misspelling)	Pear shoot gall moth; pear fruit borer	Lepidoptera: Blastodacnidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – bark, bud, shoot (AQSIQ, 2002); stem, twig (Park, 1986)	
Carposina sasakii Matsumura Syn. = *Carposina niponensis* (Walsingham); *Carposina persicana* (Fitch); *Carposina persicana* Matsumura	Peach fruit moth; peach fruit borer; date maggot	Lepidoptera: Carposinidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	Yes – fruit, seed (CAB International, 2002; CABI/EPPO, 1997a)	**Yes**
Chrysobothris succedanea Saunders, 1875	Six-spotted buprestid	Coleoptera: Buprestidae	Yes – (CIQ SA, 2001)	No	Quarantine	No – leaf, root, stem, wood (in phloem underneath bark) (CSIRO, 1991)	
Cicadella viridis (Linnaeus, 1758) Syn. = *Cicada viridis* Linnaeus, 1758; *Tettigonia arundinis* Germar, 1821; *Tettigonia melanchloa* Walker, 1851; *Tettigoniella flavicatella* de Graaf & Snellen van Vollenhoven, 1854; *Tettigoniella viridis concolor* Haupt, 1912; *Amblycephalus viridis* (Linnaeus); *Locusta viridis* (Linnaeus); *Tettigella viridis* (Linnaeus); *Tettigoniella viridis* (Linnaeus)	Green leafhopper	Hemiptera: Cicadellidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – leaf, stem (CAPQ, 1996)	
Clania variegata (Snellen, 1879) Syn. = *Cryptothelea variegata* Snellen, 1879; *Eumeta variegata* (Snellen); *Clania layardi* (Moore); *Clania sikkima* (Moore)	Cotton bagworm; giant bagworm	Lepidoptera: Psychidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – branch, leaf (AQSIQ, 2002; Sun *et al*., 1999)	
Conogethes punctiferalis (Guenée, 1854)	Yellow peach moth; castor borer; castor seed	Lepidoptera: Pyralidae	Yes – (CIQ SA, 2001)	Yes – (Nielsen *et al*., 1996)	Non-quarantine	Yes – fruit, leaf, stem (CAB International,	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Syn. = *Astura punctiferalis* Guenée, 1854; *Deiopeia detracta* (Walker, 1859); *Botys nicippealis* (Walker, 1859); *Astura guttatalis* (Walker, 1866); *Dichocrocis punctiferalis* (Guenée); *Cognogethes punctiferalis* (misspelling)	caterpillar; corn moth; maize moth; peach moth; peach pyralid moth; Queensland boll worm; shoot borer; smaller maize borer					2002)	
Cryptotympana atrata (Fabricius, 1775)	Black cicada	Hemiptera: Cicadidae	Yes – (CIQ SA, 2001)	No – (Moulds, 1990)	Quarantine	No – stem (CAPQ, 1996)	
Diaspidiotus perniciosus (Comstock, 1881) Syn. = *Aonidia fusca* Maskell, 1895; *Aonidiella fusca* (Maskell); *Aonidiella perniciosa* (Comstock); *Aspidiotus* (*Comstockaspis*) *perniciosus* (Comstock); *Aspidiotus* (*Diaspidiotus*) *andromelas* Cockerell, 1897; *Aspidiotus* (*Diaspidiotus*) *perniciosus* (Comstock); *Aspidiotus* (*Hemiberlesiana*) *perniciosus* (Comstock); *Aspidiotus* (*Quadraspidiotus*) *perniciosus* (Comstock); *Aspidiotus albopunctatus* Cockerell, 1896; *Aspidiotus fuscus* (Maskell); *Aspidiotus perniciosus* Comstock, 1881; *Comstockaspis perniciosa* (Comstock); *Diaspidiotus perniciosus* (Comstock); *Hemiberlesia perniciosa* (Comstock); *Quadraspidiotus* (*Aspidiotus*) *perniciosus* (Comstock); *Quadraspidiotus perniciosus* (Comstock)	San José scale; California scale; Chinese scale; perniciosus scale	Hemiptera: Diaspididae	Yes – (CAB International, 2002; CIQ SA, 2001)	Yes – (CIE, 1986)	Non-quarantine	Yes – bark, branch, fruit, leaf, stem (CAB International, 2002)	
Drosicha corpulenta (Kuwana)	Giant mealybug	Hemiptera:	Yes – (CIQ	No	Quarantine	No – bark, young	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Syn. = *Monophlebus corpulentus*; *Warajicoccus corpulentus*		Margarodidae	SA, 2001)			buds (Xu *et al*., 1999)	
Eriophyes pyri (Pagenstecher, 1857) Syn. = *Phytoptus pyri* Pagenstecher, 1857	Pear leaf blister mite; gall mite	Acarina: Eriophyidae	Yes – (CIQ SA, 2001; IIE, 1991)	Yes – (IIE, 1991)	Non-quarantine	No – flower and leaf buds, fruitlets, leaf, shoot (Alford, 1984)	
Erthesina fullo (Thunberg) Syn. = *Erythesina fullo* (misspelling)	Yellow spot stink bug; yellow marmorated stink bug; Hong Kong shield bug	Hemiptera: Pentatomidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – developing fruit (CIQ SA, 2001); stem (CAPQ, 1996)	
Eulecanium kunoense (Kuwana, 1907) Syn. = *Lecanium kunoensis* Kuwana, 1907; *Eulecanium kunoense* (Kuwana); *Eulecanium kumoensis* (misspelling); *Coccus kunoensis* (Kuwana)	Japanese tortoise scale; kuno scale; peach firm scale	Hemiptera: Coccidae	Yes – (Ben-Dov, 2002; CIQ SA, 2001)	No – (Ben-Dov, 2002)	Quarantine	No – branch, leaf (AQSIQ, 2002); leaf, stem (CAPQ, 1996)	
Euproctis similis (Fuessly, 1775) Syn. = *Phalaena similis* Fuessly, 1775; *Porthesia nyctea* Grum-Grshimailo, 1891; *rebeli* Haberhauer, 1902; *Porthesia similis* var. *xanthocampa* Dyar, 1905; *Porthesia similis* ab. *trimaculata* Strand, 1910; *Porthesia similis* ab. *quadrimaculata* Strand, 1910; *Porthesia similis* f. *coreacola* Matsumura, 1933; *Porthesia similis* ab. *wilczynskia* Wize, 1934; *Porthesia chrysorrhoea* ab. *punctellata* Lempke, 1937; *Porthesia similis* subsp. *sjoquisti* Bryk, 1942; *Porthesia similis* ssp. *varabilina* Bryk, 1948; *Euproctis similis* ab.	Mulberry tussock moth; browntail moth, gold-tail moth; swan moth; yellow tail moth	Lepidoptera: Lymantriidae	Yes – (CIE, 1978; CIQ SA, 2001)	No – (CIE, 1978; Nielsen *et al*., 1996)	Quarantine	No – bark, bud, leaf (AQSIQ, 2002)	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
marginalis Cockayne, 1951; *Euproctis similis* ab. *nigrostriata* Cockayne, 1951; *Euproctis similis* f. *immaculata* Lempke, 1959; *Euproctis similis* f. *fuscabdominata* Lempke, 1959; *Euproctis similis* f. *nigricosta* Lempke, 1959; *Porthesia similis* (Fuessly); *Sphrageidus similis* (Fuessly)							
Grapholita molesta (Busck, 1916) Syn. = *Carpocapsa molesta* Busck, 1916; *Cydia molesta* (Busck); *Laspeyresia molesta* (Busck)	Oriental fruit moth; pear small borer	Lepidoptera: Tortricidae	Yes – (CIQ SA, 2001)	Yes – (Nielsen *et al*., 1996) (under official control in WA)	Quarantine	Yes – fruit, leaf, stem, twig (CAB International, 2002)	**Yes**
Halyomorpha picus (Fabricius, 1794)	Yellow-brown stink bug; tree stink bug	Hemiptera: Pentatomidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	Yes – fruit, leaf, stem (CAPQ, 1996)	**Yes**
Helicoverpa armigera (Hübner, 1805) Syn. = *Noctua armigera* Hübner, 1805; *Noctua barbara* (Fabricius, 1794) suppr.; *Heliothis conferta* (Walker, 1857); *Heliothis pulverosa* (Walker, 1857); *Heliothis uniformis* (Wallengren, 1860); *Heliothis fusca* Cockerell, 1889; *Helicoverpa commoni* Hardwick, 1965; *Heliothis rama* Bhattacherjee & Gupta, 1972; *Heliothis armigera* (Hübner); *Chloridea armigera* Hübner; *Heliothis obsoleta* auct.; *Helicoverpa obsoleta* auct.; *Chloridea obsoleta*	Cotton bollworm	Lepidoptera: Noctuidae	Yes – (CIQ SA, 2001; IIE, 1993)	Yes – (IIE, 1993; Nielsen *et al*., 1996)	Non-quarantine	Yes – flower, fruit, leaf (CAB International, 2002)	
Hoplocampa pyricola Rohwer	Pear fruit sawfly; pear sawfly	Hymenoptera: Tenthredinidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	Yes – flower, fruit (CAPQ, 1996)	**Yes**
Illiberis pruni Dyar, 1905	Pear leaf worm; pear dumpling moth; apple moth	Lepidoptera: Zygaenidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – bud, leaf (CAPQ, 1996)	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Janus piri Okamoto & Muramatsu	Pear shoot girdler; pear stem sawfly	Hymenoptera: Cephidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – branch, shoot (Liu, 2001); stem (CAPQ, 1996)	
Lampra limbata Gebler, 1832	Golden jewel beetle; yellow-margined buprestid	Coleoptera: Buprestidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – stem (CAPQ, 1996)	
Leucoptera malifoliella (Costa, 1836) Syn. = *Leucoptera scitella* (Zeller, 1839); *Cemiostoma scitella* Zeller; *Elachista malifoliella* Costa, 1836; *Opostega scitella* Zeller	Pear leaf blister moth; apple leaf blister moth; pear leafminer	Lepidoptera: Lyonetiidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	Yes – Larvae known to pupate on fruit (Blanc, 1983); bud, leaf (CAPQ, 1996)	**Yes**
Lygocoris (*Apolygus*) *lucorum* (Meyer-Dür, 1843) Syn. = *Lygus lucorum* Meyer-Dür, 1843	Green leaf bug; small green plant bug; grassbug	Hemiptera: Miridae	Yes – (CIQ SA, 2001)	No	Quarantine	No – young buds, flower, leaf (Liu *et al*., 1989); stem (Zhang, 1989)	
Lymantria dispar (Linnaeus, 1758) Syn. = *Phalaena dispar* Linnaeus, 1758; *Bombyx dispar* (Linnaeus); *Porthetria dispar* (Linnaeus); *Ocneria dispar* (Linnaeus); *Liparis dispar* (Linnaeus); *Hypogymna dispar* (Linnaeus); *Porthesia dispar* (Linnaeus)	Gypsy moth	Lepidoptera: Lymantriidae	Yes – (CAB International, 2002; CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	Yes – fruit (AQIS, 1998); bud, flower, leaf (CAB International, 2002)	**Yes**
Malacosoma neustria testacea Motschulsky	Tent caterpillar	Lepidoptera: Lasiocampidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – bud, leaf (CAPQ, 1996)	
Maladera orientalis (Motschulsky, 1857) Syn. = *Serica orientalis* Motschulsky, 1857; *Aserica orientalis* (Motschulsky)	Smaller velvet chafer; smaller velvety chafer	Coleoptera: Scarabaeidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – leaf (CAPQ, 1996); root (CSIRO, 1991)	
Monema flavescens Walker, 1855	Oriental pear	Lepidoptera:	Yes – (CIQ	No –	Quarantine	No – bud, leaf	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Syn. = *Cnidocampa flavescens* (Walker); *Miresa flavescens* (Walker); *Knidocampa flavescens* (misspelling)	moth; slug moth	Limacodidae	SA, 2001)	(Nielsen *et al*., 1996)		(CAPQ, 1996)	
Myzus persicae (Sulzer, 1776) Syn. = *Aphis convolvuli* Kaltenbach, 1843; *Aphis cynoglossi* Walker, 1848; *Aphis derelicta* Walker, 1849; *Aphis dianthi* Schrank, 1801; *Aphis dubia* Curtis, 1842; *Aphis egressa* Walker, 1849; *Aphis malvae* Mosl., 1841; *Aphis persicae* Sulzer, 1776; *Aphis persiciphila*; *Aphis persola* Walker, 1848; *Aphis rapae* Curtis, 1842; *Aphis redundans* Walker, 1849 sec. Laing, 1925; *Aphis suffragans* Walker, 1848; *Aphis tuberoscellae*; *Aphis vastator*; *Aphis vulgaris* Kyber, 1815 (sec. Walker); *Aulacorthum convolvuli*; *Myzodes persicae* (Sulzer); *Myzodes tabaci* Mordvilko, 1914; *Myzoides pericae*; *Myzus dianthi* (Schrank); *Myzus malvae* Oestl., 1866 (sec. Theob.); *Myzus pergandier* Sanders, 1901 sec. Patch; *Nectarosiphon persicae* (Sulzer); *Phorodon persicae* (Sulzer); *Rhopalosiphum betae* Theobald, 1913; *Rhopalosiphum calthae* Koch, 1854; *Rhopalosiphum dianthi* Schrank; *Rhopalosiphum lactucellum* Theobald, 1915; *Rhopalosiphum lactucellum*; *Rhopalosiphum persicae*; *Rhopalosiphum solani* Theobald, 1912 non Kalt, 1843; *Rhopalosiphum tuberosellae* Theobald, 1922;	Green peach aphid; cabbage aphid; green sesame aphid; peach aphid; peach curl aphid; peach-potato aphid; potato aphid; tobacco aphid	Hemiptera: Aphididae	Yes – (CIQ SA, 2001)	Yes – NSW, NT, QLD, SA, TAS, VIC, WA (CIE, 1979)	Non-quarantine	No – bud, flower, leaf, shoot, stem (CAB International, 2002)	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Siphonophora achyrantes Mon., 1879; *Siphonophora nasturtii* Koch, 1855							
Pandemis heparana (Denis & Schiffermüller, 1775) Syn. = *Tortrix heparana* Denis & Schiffermüller, 1775; *Argyroploce heparana* (Denis & Schiffermüller)	Fruit-tree tortrix; apple brown tortrix; dark fruit-tree tortrix moth; brown tortrix moth	Lepidoptera: Tortricidae	Yes – (CIQ SA, 2001; Hwang, 1974)	No – (Nielsen *et al*., 1996)	Quarantine	Yes – fruit, leaf, shoot (Dickler, 1991); bud, flower, leaf (CAPQ, 1996)	**Yes**
Panonychus ulmi (Koch) Syn. = *Metatetranychus mali*; *Metatetranychus pilosus* (Canestrini & Fanzago); *Oligonychus ulmi*; *Paratetranychus pilosus occidentalis*; *Paratetranychus ulmi*; *Tetranychus pilosus*; *Tetranychus ulmi*; *Paratetranychus pilosus* (Canestrini & Fanzago); *Metatetranychus ulmi* Koch	European red spider mite; European red mite; fruit tree red spider mite	Acarina: Tetranychidae	Yes – (CIQ SA, 2001; IIE, 1996a)	Yes – (IIE, 1996a) (under official control in WA and NT)	Quarantine	Yes – fruit (Baillod *et al*., 1992); bud, leaf (CAPQ, 1996)	**Yes**
Parasa consocia Walker, 1863 Syn. = *Latoia consocia* (Walker, 1863)	Green cochlid; green stinging caterpillar; slug moth caterpillar	Lepidoptera: Limacodidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – leaf (CAPQ, 1996)	
Phalera flavescens (Bremer & Grey, 1853)	Cherry caterpillar; apple boat-shaped caterpillar	Lepidoptera: Notodontidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – bud, leaf (CAPQ, 1996); leaf (Auersch, 1975)	
Phyllonorycter ringoniella (Matsumura) Syn. = *Lithocolletis ringoniella* Matsumura	Asiatic apple leafminer; apple leafminer	Lepidoptera: Gracillariidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – bud, leaf (Lee *et al*., 1985); leaf (Sun *et al*., 2000)	
Platypleura kaempferi (Fabricius, 1794)	Kaempfer cicada	Hemiptera: Cicadidae	Yes – (CIQ SA, 2001)	No – (Moulds, 1990)	Quarantine	No – trunk (Uematsu & Onogi, 1980)	
Popillia quadriguttata Fabricius, 1787	Chinese rose beetle; four-	Coleoptera: Scarabaeidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – flower, leaf (CAPQ, 1996)	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
	spotted chafer						
Potosia brevitarsis (Lewis, 1879) Syn. = *Protaetia brevitarsis* Lewis, 1879; *Protaetia* (*Calopotosia*) *brevitarsis* (Lewis); *Liocola brevitarsis* (Lewis); *Netocia brevitarsis*	White-spotted flower chafer	Coleoptera: Scarabaeidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – bud, flower (AQIS, 1998)	
Proagopertha lucidula Faldermann, 1835	Lucidula chafer	Coleoptera: Scarabaeidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – flower, leaf (Lee *et al*., 1973); flower, root (CAPQ, 1996)	
Pseudococcus comstocki (Kuwana, 1902) Syn. = *Dactylopius comstocki* Kuwana, 1902	Comstock mealybug; Japanese mealybug	Hemiptera: Pseudococcidae	Yes – (CIQ SA, 2001)	No – (Ben-Dov & German, 2002)	Quarantine	Yes – bud, fruit, leaf, root (CAPQ, 1996)	**Yes**
Psylla chinensis Yang & Li	Chinese pear psyllid; pear psylla	Hemiptera: Psyllidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – bud, leaf (CAPQ, 1996)	
Rhynchites foveipennis Fairmaire, 1888	Korean pear weevil; pear curculio	Coleoptera: Attelabidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	Yes – fruit (CAPQ, 1996)	**Yes**
Schizaphis piricola (Matsumura)	Pear aphid; pear yellow aphid; early pear bud aphid	Hemiptera: Aphididae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – bud, leaf (CIQ SA, 2001)	
Spilonota lechriaspis Meyrick Syn. = *Eucosma lechriaspis*	Tipshoot tortrix; bud moth; apple fruit licker	Lepidoptera: Tortricidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	Yes – fruit (CAPQ, 1996)	**Yes**
Spulerina astaurota (Meyrick) Syn. = *Acrocercops astaurota* Meyrick	Pear barkminer; leaf blotch miner	Lepidoptera: Gracillariidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	Yes – fruit (AQIS, 1998); bark, leaf (Angulo-Sandoval & Aide, 2000)	**Yes**
Stephanitis nashi Esaki & Takeya, 1931	Pear lace bug; nashi lace bug	Hemiptera: Tingidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	Yes – fruit (AQIS, 1998)	**Yes**
Synanthedon hector (Butler, 1878) Syn. = *Aegeria hector* Butler;	Apple twig borer; cherry tree borer	Lepidoptera: Sesiidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – branch, trunk, twig (Kang *et al*., 1991); stem	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Conopia hector Butler; *Sesia hector* Butler						(CAPQ, 1996)	
Tetranychus urticae Koch, 1836 Syn. = *Acarus telarius* Linnaeus, 1758; *Acarus cucumeris* Boisduval, 1867; *Acarus rosarum* Boisduval, 1867; *Tetranychus rosarum* (Boisduval); *Tetranychus cucumeris* (Boisduval); *Tetranychus telarius* (Linnaeus); *Tetranychus bimaculatus* Harvey; *Eotetranychus scabrisetus*; *Epitetranychus althaeae*; *Epitetranychus bimaculatus* (Harvey); *Epitetranychus telarius* (Linnaeus); *Paratetranychus althaeae* von Hanstein; *Tetranychus althaeae* von Hanstein; *Tetranychus fragariae*; *Tetranychus manihotis*; *Tetranychus russeolus*; *Tetranychus scabrisetus*	Two-spotted spider mite; two spotted mite; glasshouse red spider mite; greenhouse red spider mite; hop red spider mite	Acarina: Tetranychidae	Yes – (CIQ SA, 2001; IIE, 1996b)	Yes – NSW, QLD, SA, TAS, VIC, WA (IIE, 1996b)	Non-quarantine	Yes – branch, fruit, leaf, twig (Kang *et al.* 1991)	
Tetranychus viennensis Zacher	Hawthorn spider mite; hawthorn red spider mite	Acarina: Tetranychidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	Yes – fruit, flower, leaf (Pucat & Garland, 1996)	**Yes**
Thosea sinensis (Walker)	Coconut cup moth; black spotted slug-caterpillar; Chinese nettle caterpillar; nettle grub	Lepidoptera: Limacodidae	Yes – (CIQ SA, 2001)	No – (Nielsen *et al*., 1996)	Quarantine	No – bud, leaf (CAPQ, 1996); leaf (Robinson *et al*., 2001)	
Urochela luteovaria Distant, 1881	Pear stink bug	Hemiptera: Urostylidae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	Yes – fruit, leaf (CAPQ, 1996)	**Yes**
Nematoda							
Meloidogyne spp.	Root-knot nematode	Tylenchida: Meloidogynidae	Yes – (CIQ SA, 2001)	? – Genus is present in Australia	Non-quarantine	No – root (CAB International, 2002)	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
				(CAB International, 2002)			
Bacteria							
Erwinia amylovora (Burrill, 1882) Winslow *et al*., 1820 Syn. = *Bacillus amylovorus* (Burrill) Trevisan, 1889; *Bacterium amylovorum* Chester, 1901; *Erwinia amylovora* f.sp. *rubi* Starr *et al*., 1951; *Micrococcus amylovorus* Burrill, 1882	Fire blight	Enterobacteriales: Enterobacteriaceae	Hebei and Shandong Provinces free, status in the rest of China needs confirmation	No – (CABI/EPPO, 1997b)	Quarantine	Yes – fruit, leaf, shoot, twig (CABI/EPPO, 1997b)	**Yes**
Rhizobium radiobacter (Beijerinck & van Delden, 1902) Young *et al*., 2001 Syn. = *Agrobacterium radiobacter* (Beijerinck & van Delden, 1902) Conn, 1942; *Agrobacterium radiobacter* subsp. *tumefaciens* (Smith & Townsend) De Ley *et al*., 1966; *Agrobacterium* sp. *biovar 1*; *Agrobacterium tumefaciens* (Smith & Townsend) Conn, 1942; *Agrobacterium tumefaciens biotype* 1; *Agrobacterium tumefaciens biovar 1*; *Bacillus ampelopsorae* De Toni & Trevisan, 1889; *Bacillus radiobacter* Beijerinck & van Delden, 1902; *Bacillus tumefaciens* (Smith & Townsend) Holland, 1920; *Bacterium radiobacter* (Beijerinck & van Delden) Löhnis, 1904; *Bacterium tumefaciens* Smith & Townsend, 1907; *Phytomonas tumefaciens* (Smith & Townsend) Bergey *et al*., 1923; *Polymonas tumefaciens* (Smith &	Pear crown gall; crown gall; bacterial gall; bacterial stem gall; burr knot; crown knot; root gall; root knot	Rhizobiales: Rhizobiaceae	Yes – (CIQ SA, 2001)	Yes – NSW, QLD, SA, TAS, VIC, WA (Bradbury, 1986)	Non-quarantine	No – root, stem (CAB International 2002)	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Townsend) Lieske, 1928; *Pseudomonas radiobacter* (Beij. & v. Deld.) Krasil'nikov, 1949; *Pseudomonas tumefaciens* (Smith & Townsend) Duggar, 1909; *Rhizobium radiobacter* (Beij. & v. Deld.) Pribram, 1933							
Fungi							
Alternaria gaisen Nagano Syn. = *Alternaria bokurai* Miura; *Alternaria kikuchiana* S. Tanaka (illegitimate)	Pear black spot; Japanese pear black spot; fruit rot	Mitosporic fungi	Yes – (CIQ SA, 2001)	No – (CAB International, 2002; IMI, 1996)	Quarantine	Yes – fruit, leaf, stem (CAPQ, 1996); flower, fruit, leaf, petiole, shoot (Sakuma, 1990)	**Yes**
Armillaria tabescens (Scop.) Dennis, P.D. Orton & Hora Syn. = *Armillariella tabescens* (Scop.) Singer; *Clitocybe parasitica* E.M. Wilcox; *Clitocybe tabescens* (Scop.) Bres.; *Agaricus gymnopodius* Bull.; *Agaricus socialis* DC.; *Agaricus tabescens* Scop.; *Armillaria mellea* var. *tabescens* (Scop.) Rea & Ramsb.; *Armillaria socialis* (DC.) Herink; *Clitocybe monadelpha* Morgan; *Clitocybe monadelphus* (Morg.) Sacc.	Pear armillaria root rot; clitocybe root rot	Agaricales: Marasmiaceae	Yes – (CIQ SA, 2001)	No – (CAB International, 2002)	Quarantine	No – root (Drake, 1990)	
Botryosphaeria berengeriana f.sp. *piricola* (Nose) Koganezawa & Sakuma Syn. = *Guignardia piricola* (Nose) Yamamoto; *Physalospora piricola* Nose; *Macrophoma malorum* [anamorph]	Pear ring spot; apple blister canker, apple ring rot; blister canker; nailhead canker; pear fruit canker; physalospora canker; wart bark	Dothideales: Botryosphaeriaceae	Yes – (CIQ SA, 2001)	No – (CAB International, 2002)	Quarantine	Yes – fruit, leaf, stem (CAPQ, 1996); bark, branch, fruit, twig (Jones, 1990a)	**Yes**
Botryosphaeria dothidea (Mougeot ex	Pear tree dieback;	Dothideales:	Yes – (CIQ	Yes –	Non-	Yes – bark,	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
E.M. Fries) Cesati & de Notaris Syn. = *Botryosphaeria berengeriana* de Notaris; *Dothiorella mali* Ellis & Everh.; *Fusicoccum aesculi* Corda [anamorph]	white rot	Botryosphaeriacea e	SA, 2001)	(APDDB, 2002)	quarantine	branch, fruit, twig (Sutton, 1990c)	
Colletotrichum gloeosporioides (Penz.) Penz. & Sacc. Syn. = *Glomerella cingulata* (Stonem.) Spauld. & Schrenk [teleomorph]; *Colletotrichum agaves* Cavara; *Gloeosporium affine* Sacc.; *Phyllosticta trillii* Ellis & Everh.; *Sphaeropsis lappae* Ellis & Everh. (unknown)	Pear anthracnose; bitter rot; fruit rot; ripe rot; stem canker; tear stain	Phyllachorales: Phyllachoraceae	Yes – (CIQ SA, 2001)	Yes – ACT, NSW, QLD, WA (CAB International , 2002)	Non-quarantine	Yes – fruit, stem (CAPQ, 1996); fruit, leaf (Sutton, 1990a)	
Corticium rolfsii Curzi [teleomorph] Syn. = *Corticium rolfsii* Curzi; *Botryobasidium rolfsii* (Saccardo) Venkat.; *Corticium centrifugum* (Lév.) Bresad.; *Hypochnus centrifugus* (Lév.) Tul.; *Sclerotium rolfsii* var. *rolfsii* Saccardo; *Athelia rolfsii* (Curzi) C.C. Tu & Kimbrough [teleomorph]; *Pellicularia rolfsii* (Curzi) E. West [teleomorph]; *Sclerotium rolfsii* Sacc. [teleomorph]	Pear tree white silk; collar rot; sclerotium rot	Polyporales: Corticiaceae	Yes – (CIQ SA, 2001)	Yes – ACT, NSW, QLD, SA, TAS, VIC, WA (IMI, 1992)	Non-quarantine	Yes – branch, fruit, leaf, root, stem (CAB International, 2002)	
Diaporthe ambigua Nitschke	European pear diaporthe twig blight; pear canker	Diaporthales: Valsaceae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	No – branch, root (Smit *et al*., 1996)	
Fomes sp.	Pear tree heart rot	Polyporales: Polyporaceae	Yes – CIQ SA, 2001	? – Genus is present in Australia (APPD, 2002)	Quarantine	No – branch, trunk (APPD, 2002)	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Gloeodes pomigena (Schwein.) Colby Syn. = *Marssonia mali* (P. Henning) Ito; *Dothidea pomigena* Schwein.; *Marssonina coronaria* (Ellis & J.J. Davis) J.J. Davis; *Phyllosticta solitaria* Ell. & Ev.	Pear sooty blotch	Mitosporic fungi: Coelomycetes	Yes – (CIQ SA, 2001)	Yes – (APDDB, 2002; Shivas, 1989)	Non-quarantine	Yes – fruit, twig (Sutton, 1990b)	
Gymnosporangium asiaticum Miyabe ex G. Yamada Syn. = *Roestelia koreaensis* P. Henn., 1889 [anamorph]; *Gymnosporangium chinense* Long, 1914; *Gymnosporangium koreaense* H.S. Jackson, 1916; *Gymnosporangium spiniferum* Sydow & P. Sydow; *Gymnosporangium haraeanum* H. Sydow & P. Sydow; *Gymnosporangium japonicum* P. Sydow	Japanese pear rust; Oriental pear rust	Uredinales: Pucciniaceae	Yes – (CIQ SA, 2001)	No – (CAB International, 2002)	Quarantine	Yes – fruit, leaf, stem (CAPQ, 1996); leaf, stem, twig (Aldwinckle, 1990)	**Yes**
Helicobasidium mompa Tanaka	Pear tree violet root rot	Platygloeaceae	Yes – (CIQ SA, 2001)	No – (APPD, 2002)	Quarantine	No – root (Segawa & Harada, 1990)	
Monilinia fructigena Honey [teleomorph] Syn. = *Monilia cinerea* Bonord. [anamorph]; *Monilia fructigena* (Pers.) Pers. [anamorph]; *Monilia laxa* (Ehrenb.) Sacc. [anamorph]; *Oidium fructigenum* Künze & Schmidt [anamorph]; *Sclerotinia cinerea* (Bonord.) J. Schröt. [anamorph]; *Sclerotinia fructigena* (Pers.) J. Schröt. [anamorph]; *Monilinia cinerea* [teleomorph]; *Sclerotinia laxa* Aderhold & Ruhland [teleomorph]	Pear brown rot	Helotiales: Sclerotiniaceae	Yes – (CIQ SA, 2001)	No – (CAB International, 2002)	Quarantine	Yes – fruit (CAPQ, 1996); bark, branch, flower, fruit, shoot, twig (Jones, 1990b)	**Yes**

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Mycosphaerella pyri (Auersw.) Boerema Syn. = *Sphaerella pyri* Auersw.; *Septoria pyricola* (Desmaz.) Desmaz. [anamorph]; *Depazea pyricola* Desm.; *Mycosphaerella sentina* (Fr.) Schröter	Pear brown spot; pear fruit spot; pear leaf spot	Mycosphaerellales : Mycosphaerellaceae	Yes – (CIQ SA, 2001)	No – (Sivanesan, 1990)	Quarantine	No – leaf (CAPQ, 1996; van der Zwet, 1990)	
Phomopsis fukushii Tanaka et Eudo Syn. = *Diaporthe medusaea* Nitschke [teleomorph]; *Diaporthe tanakae* Kobaryashi & Sakuma	Japanese pear canker; pear tree phomopsis; twig blight; phomopsis canker; phomopsis fruit rot; die-back	Mitosporic fungi	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	Yes – fruit (Nasu *et al*., 1987); bark (Fukutomi *et al*., 1991); stem (CAPQ, 1996); rarely affects fruit in storage (AQIS, 1998)	**Yes**
Phyllactinia guttata f.sp. *pyri* Akhundov Syn. = *Ovulariopsis pyri*; *Phyllactinia pyri* (Pers.) Karst.	Pear powdery mildew	Erysiphales: Erysiphaceae	Yes – (CIQ SA, 2001)	No – (APPD, 2002)	Quarantine	No – leaf, petiole, peduncle (Kurt & Soylu, 2001)	
Rosellinia necatrix Prillieux Syn. = *Dematophora necatrix* R. Hartig, 1883 [anamorph]	Pear tree white root rot; dematophora root rot	Xylariales: Xylariaceae	Yes – (CIQ SA, 2001)	No – (CAB International , 2002)	Quarantine	No – bark, root, stem (CAB International, 2002); bark, root (Sztejnberg, 1990)	
Schizothyrium pomi (Mont. & Fr.) Arx Syn. = *Zygophiala jamaicensis* Mason [anamorph]; *Leptothyrium pomi* (Mont. & Fr.) Sacc.; *Labrella pomi* Mont.; *Microthyriella pomi*; *Microthyriella rubi* Baines	Pear flyspeck	Microthyriales: Schizothyriaceae	Yes – (CIQ SA, 2001)	Yes – (APDDB, 2002)	Non-quarantine	Yes – fruit, stem, twig (Sutton, 1990b)	
Valsa ambiens (Pers. : Fr.) Fr. Syn. = *Cytospora ambiens* Sacc.	Pear canker; valsa canker (dieback)	Xylariales: Diatrypaceae	Yes – (CIQ SA, 2001)	No – (AQIS, 1998)	Quarantine	Yes – fruit (AQIS, 1998)	**Yes**
Venturia pirina Aderhold	Pear scab	Pleosporales:	Yes – (CIQ	Yes – NSW,	Non-	Yes – flower, fruit,	

Scientific name	Common name(s)	Order: Family	Present in China	Present in Australia	Quarantine status in Australia	Present on importation pathway (fruit)	Management options required
Syn. = *Endostigma pirina* (Aderh.) Sydow, 1923; *Venturia pirina* f. sp. *piri* Bref., 1891; *Fusicladium pyrorum* (= *pyrinum*) (Lib.) Fuckel, 1870; *Megacladosporium pyrorum* (= *pirinum*) (Lib.) Viennot-Bourg., 1949; *Arthrinium pyrinum* Wallr., 1833; *Fusidium pyrinum* Corda, 1837; *Fusicladium virescens* Bonorden, 1851		Venturiaceae	SA, 2001)	QLD, SA, VIC, WA (CMI, 1982)	quarantine	leaf, stem (CAPQ, 1996); fruit, leaf, shoot, twig (Shabi, 1990)	

Acronyms: ACT – Australian Capital Territory; NSW – New South Wales; NT – Northern Territory; QLD – Queensland; SA – South Australia; TAS – Tasmania; VIC – Victoria; WA – Western Australia

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APPENDIX 2: PESTS ASSOCIATED WITH YA PEAR (*PYRUS BRETSCHNEIDERI* REDH.) FROM CHINA (HEBEI AND SHANDONG PROVINCES)

Species	Common name(s)	Present in China	Present in Australia	Quarantine pest status	Association with Fruit (Risk potential[1])	Risk management measure[2]
ARTHROPODS						
Acleris fimbriana	fruit tree tortrix	yes	no	Quarantine	yes	Inspection
Acronicta increta	raspberry bud moth, peach sword stripe night moth	yes	no	Quarantine	no	
Actias selene	moon moth	yes	no	Quarantine	no	
Adoxophyes orana	reticulated tortrix, summer fruit tortrix	yes	no	Quarantine	yes (high)	Inspection and management
Agrilus mali	apple wood borer, apple buprestid beetle	yes	no	Quarantine	no	
Amsacta lactinea	red tiger moth	yes	no	Quarantine	no	
Anomala corpulenta	scarab, chafer	yes	no	Quarantine	no	
Anoplophora glabripennis	longhorn, citrus borer	yes	no	Quarantine	no	
Anuraphis piricola		yes	no	Quarantine	no	
Aphanostigma iakusuiensis	powdery pear aphid, pear phylloxera	yes	no	Quarantine	yes (high)	Inspection and management
Aphis spiraecola	spiraea aphid, apple aphid	yes	yes	Non Quarantine		
Apocheima cinerarius	mulberry geometrid, poplar looper	yes	no	Quarantine	no	
Aporia crataegi	blackveined white, hawthorn butterfly	yes	no	Quarantine	no	
Apriona germari	mulberry longicorn	yes	no	Quarantine	no	
Archips xylosteana	apple variegated tortrix, golden variegated moth	yes	no	Quarantine	no	
Aromia bungii	red-necked longicorn, peach redneck longicorn	yes	no	Quarantine	no	
Asias halodendri	longicorn	yes	no	Quarantine	no	
Bacchisa fortunei	pear borer	yes	no	Quarantine	no	
Bactrocera dorsalis	Oriental fruit fly	yes	no	Quarantine	yes (high)	Inspection and management
Blastodacna pyrigalla	pear fruit borer	yes	no	Quarantine	no	

[1] Risk potential was determined from the risk analysis (AQIS, 1997a). The rating of low, medium or high was assigned on the basis of assessment of both the entry potential and the potential impact of entry of the organism.

[2] Pests and diseases with low and medium ratings are addressed by routine inspection procedures. Pests and diseases with a high rating cannot be addressed by inspection alone because of their biological properties (including pathogenicity, extent of host range, potential impact and difficulty of detection). The risk posed by these pests and diseases is reduced to negligibly low levels with a combination of inspection and management strategies which are outlined in other parts of the Chinese Ya pear IRA document.

Species	Common name(s)	Present in China	Present in Australia	Quarantine pest status	Association with Fruit (Risk potential[1])	Risk management measure[2]
Bryobia rubrioculus	brown almond mite, bryobia mite	yes	yes	Non Quarantine		
Bysticus betulae	birch attelabid	yes	no	Quarantine	no	
Cacopsylla pyrisuga	pear wood psylla	yes	no	Quarantine	yes (high)	Inspection and management
Carposina sasakii (as Carposina niponensis)	peach fruit moth, peach fruit borer, date maggot	yes	no	Quarantine	yes (high)	Inspection and management
Ceroplastes japonicus	Japanese wax scale	yes	no	Quarantine	no	
Ceroplastes rubens	red/pink wax scale	yes	yes	Non Quarantine		
Cicadella viridis	green leafhopper	yes	no	Quarantine	no	
Coccus hesperidum	soft brown scale	yes	yes	Non Quarantine		
Coccus kunoensis	soft scale, peach firm scale	yes	no	Quarantine	no	
Conobathra bifidella (as Militene bifidella)	lump insect	yes	no	Quarantine	no	
Conogethes punctiferalis	yellow peach moth	yes	yes	Non Quarantine		
Cryptotympana pustulata (?=*atra*)	blackish cicada	yes	no	Quarantine	no	
Cydia inopinata	Manchurian fruit moth	yes	no	Quarantine	yes (high)	Inspection and management
Didesmococcus coreanus	soft scale, peach scale, apricot scale	yes	no	Quarantine	no	
Dolycoris baccarum	sloe bug, berry bug	yes	no	Quarantine	yes	Inspection
***Ectomyelois pyrivorella* (=*Numonia pirivorella*)**	pear fruit moth, pear moth, pear pyralid	yes	no	Quarantine	yes (high)	Inspection and management
Empoasca flavescens	small green leafhopper	yes	no	Quarantine	no	
Erythesina fullo	stink bug, yellow spot stink bug	yes	no	Quarantine	no	
Euproctis similis	browntail moth, yellow tail moth	yes	no	Quarantine	no	
Euzophera pyriella		yes	no	Quarantine	yes (high)	Inspection and management
Gastropacha quercifolia	lappet, snout moth	yes	no	Quarantine	no	
***Grapholita molesta* (=*Cydia molesta*)**	Oriental fruit moth, pear small borer	yes	present, but under official control in WA	Quarantine	yes	Inspection and management
Halyomorpha picus	tree stink bug	yes	no	Quarantine	yes	Inspection
Holotrichia parallela	large black chafer	yes	no	Quarantine	yes	Inspection
Holotrichia titanis	brown chafer	yes	no	Quarantine	yes	Inspection
Hoplocampa pyricola	pear sawfly	yes	no	Quarantine	yes	Inspection
Hoshinoa longicellana	common apple leafroller	yes	no	Quarantine	yes	Inspection

Species	Common name(s)	Present in China	Present in Australia	Quarantine pest status	Association with Fruit (Risk potential[1])	Risk management measure[2]
Icerya purchasi	cottony cushion scale, fluted scale	yes	yes	Non Quarantine		
Illiberis pruni	pear leaf worm, pear dumpling moth	yes	no	Quarantine	no	
Janus gussakovskii	stem girdler	yes	no	Quarantine	no	
Janus piri	sawfly, stem girder, stem sawfly	yes	no	Quarantine	no	
Lampra bellula	jewel beetle	yes	no	Quarantine	no	
Lampra limbata	golden jewel beetle	yes	no	Quarantine	no	
Lepidosaphes ulmi	oystershell, mussel scale	yes	yes	Non Quarantine		
Leucoptera malifoliella	apple leaf blister moth, pear leaf blister moth	yes	no	Quarantine	yes	Inspection
Lopholeucaspis japonica	pear white scale, Japanese long scale	yes	no	Quarantine	yes	Inspection
Lymantria dispar	gypsy moth	yes	no	Quarantine	yes (high)	Inspection
Malacosoma neustria	tent caterpillar, lackey moth	yes	no	Quarantine	no	
Maladera orientalis	chafer	yes	no	Quarantine	no	
Marumba gaschkewitschii	peach horn worm	yes	no	Quarantine	no	
Monema flavescens	Oriental fruit moth	yes	no	Quarantine	no	
Myzus persicae	green peach aphid	yes	yes	Non Quarantine		
Nezara viridula	green vegetable bug	yes	yes	Non Quarantine		
Odites leucostola	lecithocerid moth	yes	no	Quarantine	no	
Odonestis pruni	apple caterpillar	yes	no	Quarantine	no	
Oxycetonia jucunda	citrus flower chafer	yes	no	Quarantine	no	
Pandemis heparana	apple brown tortrix	yes	no	Quarantine	yes	Inspection
Panonychus ulmi	European red mite	yes	present but under official control in WA and NT	Quarantine	yes (high)	Inspection and management
Parasa consocia	green cochlid, green stinging caterpillar, green stinging caterpillar,	yes	no	Quarantine	no	
Parasa hilarata	stinging caterpillar, nettle grub	yes	no	Quarantine	no	
Parlatoria pergandii	chaff/black parlatoria	yes	yes	Non Quarantine		
Phalera flavescens	cherry caterpillar, apple boat-shaped caterpillar	yes	no	Quarantine	no	
Phlossa conjuncta	slug caterpillar, date thorn moth	yes	no	Quarantine	no	

Species	Common name(s)	Present in China	Present in Australia	Quarantine pest status	Association with Fruit (Risk potential[1])	Risk management measure[2]
Phyllonorycter ringoniella	apple leaf miner	yes	no	Quarantine	no	
Popillia quadriguttata	Chinese rose beetle, chafer	yes	no	Quarantine	no	
Potosia brevitarsis	bai xing hua qian	yes	no	Quarantine	no	
Proagopertha lucidula	chafer	yes	no	Quarantine	no	
Pseudaonidia duplex	camphor scale	yes	no	Quarantine	no	
Pseudaulcaspis pentagona	peach white scale, mulberry scale	yes	yes	Non Quarantine	no	
Pseudococcus comstocki	Comstock mealybug	yes	no	Quarantine	yes (high)	Inspection and management
Psylla chinensis	pear psylla	yes	no	Quarantine	no	
Quadraspidiotus perniciosus	San Jose scale	yes	yes	Non Quarantine		
Rhynchites coreanus	pear leaf weevil, pear borer, pear curculio, pear dog	yes	no	Quarantine	yes (high)	Inspection and management
Rhynchites foveipennis	Korean pear weevil	yes	no	Quarantine	yes	Inspection
Schizaphis piricola	pear yellow aphid, early pear bud aphid	yes	no	Quarantine	no	
Spilonota albicana	large apple fruit moth	yes	no	Quarantine	yes	Inspection
Spilonota lechriaspis	bud moth, apple fruit licker	yes	no	Quarantine	yes	Inspection
Spilonota ocellana	eye spotted bud moth	yes	no	Quarantine	yes	Inspection
Spulerina astaurota	pear barkminer, leaf blotch miner	yes	no	Quarantine	yes	Inspection
Stephanitis nashi	nashi lace bug	yes	no	Quarantine	yes	Inspection
Synanthedon hector	cherry treeborer	yes	no	Quarantine	no	
Telphusa chloroderces	black star leaf roller	yes	no	Quarantine	no	
Tetranychus viennensis	hawthorn red spider mite	yes	no	Quarantine	yes (high)	Inspection and management
Thosea sinensis	coconut cup moth	yes	no	Quarantine	no	
Urochela luteovaria	pear stink bug	yes	no	Quarantine	yes	Inspection
Vespa mandarinia	paper wasp	yes	no	Quarantine	yes	Inspection
BACTERIA						
Erwinia amylovora	fire blight	Hebei and Shandong Provinces free, status in the rest of China needs confirm-ation	Detected 1997 in Melbourne Royal Botanic Gardens, considered eradicated 1998	Quarantine	yes (low)	Inspection and management

Species	Common name(s)	Present in China	Present in Australia	Quarantine pest status	Association with Fruit (Risk potential[1])	Risk management measure[2]
FUNGI						
Alternaria alternata	black spot, Japanese pear black spot, fruit rot	yes	yes	Non Quarantine		
Alternaria gaisen (syn. illegitimate = *A. kikuchiana*)	black spot, Japanese pear black spot, fruit rot	yes	no	Quarantine	yes (high)	Inspection and management
Armillaria tabescens (syns. *Clitocybe tabescens*, *C. monadelphus*, *Armillariella tabescens*)	clitocybe root rot	yes	no	Quarantine	no	
Armillaria mellea (syn. *Armillariella mellea*)	armillaria root rot	yes	no	Quarantine	no	
Botryosphaeria berengeriana f.sp. ***piricola*** (syn. *Physalospora piricola*, anamorph *Macrophoma malorum*)	physalospora canker, wart bark, blister canker, apple ring rot	yes	no	Quarantine	yes (high)	Inspection and management
Botryosphaeria obtusa (syn. *Physalospora obtusa*, anamorph *Sphaeropsis malorum*)	black rot, limb canker, black canker	yes	yes	Non Quarantine		
Botrytis cinerea (teleomorph *Botryotinia fuckeliana*)	grey mould	yes	yes	Non Quarantine		
Diaporthe ambigua	canker	yes	no	Quarantine	no	
Fomes truncatospora	heart rot	yes	no	Quarantine	no	
Glomerella cingulata (anamorph *Colletotrichum gloeosporioides*)	bitter rot, fruit rot, ripe rot	yes	yes	Non Quarantine		
Gymnosporangium asiaticum (syns. *G. haraeanum*, *G. chinense*, *G. koreaense*, *G. spiniferum*)	Japanese pear rust	yes	no	Quarantine	yes (high)	Inspection and management
Monilinia fructigena	brown rot	yes	no	Quarantine	yes (high)	Inspection and management
Mycosphaerella pyri (syn. ***M. sentina***)	leaf spot	yes	no	Quarantine	no	
Penicillium expansum	blue mould	yes	yes	Non Quarantine		
Phomopsis fukushii	phomopsis canker, phomopsis fruit rot, die-back	yes	no	Quarantine	yes (rarely affects fruit in storage)	Inspection

Species	Common name(s)	Present in China	Present in Australia	Quarantine pest status	Association with Fruit (Risk potential[1])	Risk management measure[2]
Phyllactinia corylea	powdery mildew	yes	no	Quarantine	no	
Podosphaera leucotricha (anamorph *Oidium farinosum*)	powdery mildew	yes	yes	Non Quarantine		
Rhizopus stolonifer (syn. *R. nigricans*)	rhizopus rot	yes	yes	Non Quarantine		
Trichothecium roseum (syn. *Cephalothecium roseum*)	pink rot, pink mould rot	yes	yes	Non Quarantine		
Valsa ambiens	valsa canker	yes	no	Quarantine	yes	Inspection
Valsa ceratosperma (syn. *V. mali*, anamorph *Cytospora sacculus*)	valsa canker	yes	yes	Non Quarantine		
Venturia nashicola (anamorph *Fusicladium pyrorum*)	pear scab	yes	no	Quarantine	yes (high)	Inspection and management
Venturia pirina	pear scab	yes	yes	Non Quarantine		

APPENDIX 3: UPDATED DATASHEET FOR *ACROBASIS PYRIVORELLA* (MATSUMURA) ON YA & ASIAN PEARS FROM CHINA

Species: *Acrobasis pyrivorella* (Matsumura) (Pear fruit moth) [Lepidoptera: Pyralidae]

Synonym(s) and changes in combination(s): *Acrobasis pirivorella* (Matsumura); *Ectomyelois pirivorella* (Matsumura); *Eurhodope pirivorella* (Matsumura); *Nephopterix pirivorella* (Matsumura); *Nephopteryx pyrivorella* (misspelling); *Numonia pirivora* (Gerasimov); *Numonia pyrivorella* (Matsumura); *Numonia pirivorella* (Matsumura); *Myelois pirivorella* (Matsumura); *Rhodophaea pirivorella* (Matsumura); *Nephopteryx pirivorella* Matsumura; *Ectomyelois pyrivorella* (Matsumura); *Numonia pyrivora* Gerasimov. [*synonyms used in Ya pear IRA shaded*]

Common name(s): Large pear fruit borer (AQSIQ, 2002); pear driller (CAB International, 2002); pear fruit moth, pear moth, pear pyralid (CABI/EPPO, 1997).

Host(s): Wild and cultivated forms of pear are the main hosts. There is no indication that the moth attacks fruit trees other than species of *Pyrus* (Shutova, 1977).

Malus domestica (apple), *Prunus persica* (peach) (AQSIQ, 2002); *Pyrus bretschneideri* (Ya pear) (AQIS, 1998); *Pyrus communis* (pear), *Pyrus pyrifolia* var. *culta* (Japanese pear), *Pyrus* spp. (pear) (CAB International, 2002).

Part(s) of plant affected: Buds and young fruit (AQSIQ, 2002); flower, young fruit (CAB International, 2002).

Distribution: *A. pyrivorella* is indigenous to the temperate zone of eastern Asia, where it is widely distributed (CABI/EPPO, 1997).

China (AQSIQ, 2002; CABI/EPPO, 2001; Shiraki, 1952); Japan, Korea Democratic People's Republic, Korea Republic (CABI/EPPO, 2001; Shiraki, 1952); Russia, Taiwan (CABI/EPPO, 2001; Shutova, 1977).

Biology: First instar larvae are rose-pink in colour with a black head and a blackish-brown pronotum. Fully developed caterpillars are dark green dorsally and pale yellow ventrally with blackish-brown heads and pale brown legs and reach a length of 12 mm. *A. pyrivorella* overwinters as first-instar larvae or more commonly, as second instar larvae (Gibanov and Sanin, 1971; Shutova, 1970) in a thin white cocoon within the flower buds of pears. These infested buds die and do not fall, and remain on the tree. In spring, the larvae emerge and move to fresh buds, feeding on the developing buds, flowers and fruitlets, eating out the core of the latter (CABI/EPPO, 1997). Larvae may move from fruit to fruit (CABI/EPPO, 1997). A single larva can infest and destroy two or three buds, one to three primordial flowers and up to three fruits (Shutova, 1977).

Older larvae penetrate into the developing fruit to pupate (CAB International, 2002). Before doing so, they wander over the surface of the fruit spinning a web particularly around the stalk to hold the fruit onto the tree. The larvae generally enter the fruit near the calyx end or on the side of the fruit, making a prominent hole with an overhanging lip of silk and excreta (CAB International, 2002). They eat out the heart of the fruit, then pupate in the fruit, usually at the end of May, sealing the opening with a web (CAB International, 2002). Generally, pupae are brown in colour, oval and 10-12 mm in length, with a compression towards one end. Pupae lie with their heads in the direction

of the exit hole in the fruit and when the adult moth emerges the pupal case is left protruding from the fruit.

In Russia, the first adults emerge by mid-July when the fruit is about the size of a hazelnut (CABI/EPPO, 1997). However, most adults emerge between late July and mid-August (Komarova, 1984). The presence of black shrivelled fruitlets persisting on the trees seems to be a feature of attack by this species (CABI/EPPO, 1997). Adult moths are greyish with a violet tinge. The wingspan reaches 14.5–21.5 mm in length. The forewings have two transverse stripes and between them a crescent-shaped dark apical spot; the hindwings are yellowish grey. The head, thorax and dorsum are covered with ashen-violet-brown bands.

The moths lay about 120 eggs per female, both on the new flower buds and on the fruit (CABI/EPPO, 1997). Eggs are 1 mm, flat and elliptical in shape, yellow when newly laid but darkening to a reddish tint before hatching. After 8-10 days, the larvae hatch and penetrate the buds to form the overwintering cocoons (CAB International, 2002). Infested buds can be recognized by the presence of excrement and by the fact that some bud scales are missing. In cooler areas, the first flight of adults may not appear until September and the second generation is small. As a preparation for the winter, first generation adults bore into the bud and go into hibernation and those which do not succeed in doing so die (Shutova, 1970).

The above description applies to the development of the pest in Russia. In warmer countries (eg. China), the first generation adults lay eggs on fruits, within which a second generation develops to produce adults in September (CAB International, 2002). These adults then lay eggs on flower buds and the resulting larvae overwinter. Fruits that have been infested by larvae remain black and shrivelled on the tree (CAB International, 2002). The preferred environmental conditions are rain and high humidity (AQSIQ, 2002). There are two generations a year (AQSIQ, 2002).

Fruits are normally retarded in growth and turn black with a shrivelled appearance. Furthermore, the shrivelled fruits remain on the tree until the following year (Shutova, 1977). During summer, the entry holes of the pest are characteristic on the fruit. They are most often placed at the calyx end or side of the fruit, with the upper side of the opening marked by an overlapping lip of accumulated excreta and conspicuous webbings (Shutova, 1977).

The natural spread of *A. pyrivorella* by adult flight is over relatively short distances (CAB International, 2002). The main means of spread would be international trade of planting material with infested buds (Shutova, 1977). Infested fruits may also carry the pest, but its presence is relatively conspicuous (CAB International, 2002).

In Japan, this species is controlled by applying insecticides (eg fenitrothion, diazinon, cyanophos or methidathion) shortly before flowering and two later applications between June and August depending on the developmental stages of the pest (Umeya, 1980). In Russia, the latest insecticidal application is recommended for mid-August. Biological control has not been thoroughly researched (CABI/EPPO, 1997). In China, fruits are individually wrapped in paper to exclude the pest. However, in certain parts of the trees the fruits remain unwrapped and serve as bait-fruits which are destroyed after infestation (Shutova, 1977).

Entry potential: Low, as fruit infested by *A. pyrivorella* are normally retarded in growth, turn black with a shrivelled appearance and remain on the tree. Infested fruits may also carry the pest, but its presence is relatively conspicuous due to accumulated excreta and conspicuous webbings near entry holes placed at the calyx end or side of the fruit.

Establishment potential: Moderate to low, as each female can lay about 120 eggs, but this species has a small host range.

Spread potential: Low, as the natural spread of this species by adult flight is over relatively short distances.

Economic importance: Moderate to high, as in the Far Eastern territories of Russia, this species is rated as the most serious pest of cultivated pears, and damages up to 90% of pear crops (Shutova, 1970). It is also considered to be of economic importance in Japan (Siezo, 1968).

Quarantine status: Quarantine.

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APPENDIX 4: AMENDED IMPORT PROTOCOLS – YA PEAR FRUIT FROM CHINA TO AUSTRALIA (January 2003)

Item 1. Registration and submission of information

Ya pear fruit for export to Australia must be sourced from AQSIQ registered orchards in designated export areas and be packed in AQSIQ registered packing houses in the designated export areas. AQSIQ must register all export orchards and packing houses. All individual export orchards must be numbered to enable trace back in the case of non-compliance. Maps showing the location and registration number of each export orchard and packing house are to be provided to BA by AQSIQ before commencement of trade each year.

Item 2. Pest management program and general surveillance

AQSIQ must ensure that export orchards are subject to field sanitation and control measures against quarantine pests and diseases in List 1 (Section 8-Revised Summary of Quarantine Pests with High Risk Potential for Australia) of the final IRA. These controls must provide regulatory assurance that export orchards are essentially free from pests of quarantine concern to Australia. Details of the pest control program must be provided to BA by AQSIQ before commencement of trade. AQSIQ must provide a revised copy of the pest management program at pre-clearance inspection to the AQIS inspector if there is any change to the pest control program.

Detection/monitoring surveys for pests and diseases must be conducted by AQSIQ in orchards registered for export within the designated areas. AQSIQ will submit the results using a standard reporting format to BA. These pests and diseases must include fruit flies (*Bactrocera* spp.), *Euzophera pyriella*, brown rot (*Monilinia fructigena*), black spot (*Alternaria gaisen*), pear scab (*Venturia nashicola*), Japanese pear rust (*Gymnosporangium asiaticum*), physalospora canker (*Botryosphaeria berengeriana* f.sp. *piricola* (syn. *Physalospora piricola*), and fire blight (*Erwinia amylovora*) or related species. If any other exotic pest or disease of quarantine concern to Australia is detected then BA must be notified immediately for appropriate action to be taken.

AQSIQ must ensure that telial hosts (*Juniperus chinensis*, *J. procumbens*) of Japanese pear rust (*Gymnosporangium asiaticum*) within 2 km of registered orchards are removed. If Japanese pear rust is found, fruit from the export orchards within 2km of the infected site will not be accepted into Australia.

The designated export areas must be free from fire blight (*Erwinia amylovora*) or related species. If fire blight is found AQSIQ must immediately inform BA and imports will be suspended pending an investigation. If physalospora canker is found all fruit from orchards whose fruit comprised that 'lot' will be rejected.

Item 3. Fruit fly monitoring

The designated areas from which Ya pear fruit is sourced for export to Australia (i.e. export orchards, packing houses and the surrounding area) must have a pest monitoring system in place for fruit flies (Tephritidae). The traps must consist of cue lure, trimedlure and methyl eugenol.

AQSIQ must continue the current fruit fly monitoring program for Tephritidae already being carried out in Hebei Province with the addition of at least one methyl eugenol trap being placed in each export orchard and any villages present.

Summary data including number and location of traps, data on trap catches, and species caught for all fruit fly traps (methyl eugenol, cue lure, and trimedlure) is to be provided to the AQIS pre-clearance inspector.

AQSIQ will notify BA of the detection of any species of economically important fruit flies within 48 hours of detection. AQIS will assess the species and number of individual flies detected and the circumstances of the detection. AQIS will advise AQSIQ of action to be taken. If fruit flies are detected at pre-clearance inspection trade will stop immediately pending the outcome of an investigation.

Item 4. Inspection of orchards

AQSIQ must inspect all export orchards and a sample of non-export orchards in and outside of the export area and must monitor the levels of pests of concern.

1. If brown rot is detected in any designated export area, fruit from that export area will not be permitted entry into Australia.

2. Orchards infected with pear scab will not be permitted to export fruit.

3. If the level of black spot exceeds a threshold of 0.5% after orchard inspection, those orchards will be excluded from the export program.

Item 5. AQSIQ to notify BA immediately if unusual weather conditions occur resulting in brown rot, black spot or scab diseases.

Item 6. Bagging of fruit and storage

Bags must be placed over fruit when the fruit is no more than 2.5 cm in diameter. Fruit must be protected by bags to minimise the risk of exposure to diseases and pests. Export fruit must be clearly identifiable from domestic fruit. Only fruit with intact bags will be permitted for export to Australia and this fruit is not to be mixed or stored with non-export fruit. No fallen fruit is to be collected for export.

Item 7. Pre-harvest inspection

Joint inspection by AQSIQ and the AQIS inspector before harvest must ensure that field control programs are efficacious. The inspection must ensure that bags are intact, only bagged fruit are harvested, and that packing houses have an appropriate level of hygiene. The AQIS inspector must check inspection and sampling facilities, results of detection surveys, fruit fly trap records for the current season and traps if appropriate, and will determine the need to change the intensity of inspection at pre-clearance if necessary.

Item 8. Pre-clearance inspection or equivalent measures

All packing houses must be registered by AQSIQ. Packing houses must be situated within the area trapped for fruit flies. If movement of fruit is required from orchard to packing house through an untrapped area the fruit must remain within intact bags and be covered by a tarpaulin. Only fruit that meets export conditions, set out in items 1-7, with bags intact will be delivered to the packing house and must be identified by registered orchard number. The packing area must be well lit. Bags must be removed in the

packing house away from the packing line. During the Ya pear fruit packing period for export to Australia, no fruit for the domestic market is to be packed.

The fruit must be sampled in accordance with the agreed sampling plan (600 fruit per 'lot' containing > 1000 fruit; 450 for 1000 fruit or less), for visual joint inspection by AQSIQ and AQIS inspectors with the AQIS inspector determining the acceptance or rejection of fruit. Only mature, unblemished fruit may be selected for export and the inspection procedures must ensure that the Ya pear fruit is free from pests or diseases of concern to Australia and any live insects, mites, leaves, twigs and soil. Culled fruit will be removed from the packing house at the end of each day. AQIS and/or AQSIQ may further examine culled fruit for pests. Action must be taken on all quarantine pests if detected and AQSIQ technical specialists, or their nominated agents will identify all pests detected to species level, and this information forwarded to AQIS. Duplicate specimens of detected pests, if available, must be given to the AQIS inspector at the time of pre-clearance. Exports will not be permitted until the identification is completed and information sent to AQIS for approval.

An inspection 'lot' is all pear fruit harvested and packed for export to Australia each day by each orchard ("grower") or as otherwise agreed by AQIS and AQSIQ. If an inspection 'lot' is rejected due to pests or diseases in List 1. Quarantine Pests with a High Risk Potential for Australia, Final IRA, Section 8, any more fruit from that 'lot' must be withdrawn from further inspection. If an inspection 'lot' is rejected due to quarantine pests or diseases with a low or moderate risk potential for Australia (Final IRA, Section 7. Pests Associated with Ya pear in China - Table 1), the offending grower's fruit will be removed from the 'lot', and the balance of the consignment reinspected in accordance with the sampling plan. Fruit from the failed grower may be reconditioned and reinspected. A registered orchard, which has one rejection, will be permitted to submit further 'lots' for the season but if a second rejection occurs that orchard must be withdrawn from the Australian program.

AQSIQ must use new cardboard boxes and cartons. No packing material of plant origin is to be used (eg. straw); only processed or synthetic packing material can be used. When packed fruit is to be transported it must be secured using one of the following methods:

1. fruit must be packed and directly transferred into a shipping container, which must be sealed with a AQSIQ seal and not opened until the container reaches its destination;

2. fruit must be packed into cartons with screened ventilation holes; the screening mesh size must not exceed 1.6mm; or

3. fruit must be packed into cartons and the pallet of cartons must be shrink wrapped in plastic.

All cartons must be marked "For Australia", labelled with 'lot' number, orchard registration numbers, packing house number, number of cartons per 'lot' and date. Alternatively, for palletised "integral" consignments, which have been strapped and secured the information marked on the cartons must be provided in a pallet card. AQIS-inspected and cleared fruit for export to Australia must be stored under security and segregated from all other fruit in a cold store maintained at 1-3°C until loaded into containers.

AQSIQ must ensure that records are properly kept to facilitate auditing of fruit during or after storage and that container doors are sealed after loading.

Item 9. Phytosanitary certification

Upon completion of fruit sampling and inspection, a master phytosanitary certificate is to be issued AQSIQ for each 'lot', bearing the appropriate 'lot' numbers, orchard registration numbers, packing house number, number of cartons per 'lot' and date. This document must be counter-signed and dated by the AQIS pre-clearance inspector. The phytosanitary certificate is to bear the additional declaration "Produced and inspected under the Ya pear arrangement between AQSIQ and BA".

After the AQIS inspector leaves:

- For each shipment a new phytosanitary certificate, specifying the 'lots' covered by it, cartons per 'lot' and the container and seal number must be issued by AQSIQ.
- Attached to this phytosanitary certificate must be a copy of the master phytosanitary certificate jointly signed by AQSIQ and the AQIS pre-clearance inspector during pre-clearance.

Item 10. Verification of consignment in Australia

AQIS reserves the right to examine relevant certification and seals at the port of arrival in Australia. If the certification does not conform or the seals on the containers are damaged, AQIS reserves the right to have the Ya pear fruit returned to China, re-exported, or ordered to be destroyed. AQIS will inform AQSIQ of action including any intention to suspend importation.

Item 11. Visits

An AQIS inspector must visit China in each year of trade for pre-clearance inspection, both in the field and packing house. The Chinese side will pay fees for the AQIS officer to monitor the implementation of importation requirements, surveys and/or pre-clearance inspection.

Item 12. Review of requirements

BA/AQIS reserves the right to review the agreement if this is deemed necessary.

If brown rot, black spot or scab is intercepted on imported fruit, BA reserves the right to implement remedial measures as deemed necessary before trade commences next season. The remedial measures could be petal testing for brown rot and black spot and flower cluster examination for scab, latent tests or other measures as deemed necessary.