



Australian Government

Biosecurity Australia

Issues paper for the import risk analysis for fresh apple fruit from the People's Republic of China



July 2008

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Cover image:

Bagged apple fruit in an orchard in Shandong province, the People's Republic of China.

Submissions

This issues paper has been released to give all interested parties an opportunity to provide comment on issues relevant to the import risk analysis (IRA). Any comments should be submitted to Biosecurity Australia within the comment period stated in the related Biosecurity Australia Advice on the Biosecurity Australia website. Submissions will be considered during the preparation of a draft IRA report, which will be issued for comment at a later date.

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Summary

Biosecurity Australia announced the formal commencement of an import risk analysis (IRA) under the regulated IRA process to consider a proposal to import fresh apple fruit from the People's Republic of China on 17 March 2008. The IRA will be conducted using the expanded process, requiring completion within 30 months from announcement in accordance with the Quarantine Regulations 2000.

Australia already has existing quarantine policy that allows for the import of apples from Japan and New Zealand, as well as a policy for pears from China.

The issues paper provides information relevant to the import request and the import risk analysis that has been announced by Biosecurity Australia. It also includes a list of pests that are considered to be associated with apple production in China.

Many of the pests of apples are the same or similar to those associated with pear production in China. Previous risk analyses for the importation of pears from China have contributed to the preliminary work undertaken on this IRA. This work will be taken into account where appropriate.

Fire blight, caused by the bacterium *Erwinia amylovora* (Burrill) Winslow et al., is an internationally recognised and significant plant disease affecting pome fruit. Biosecurity Australia will review available information to confirm that China remains free of fire blight.

An expert panel has been formed to assist Biosecurity Australia's consideration of the scientific issues associated with the proposed importation.

Stakeholders are invited to provide comments and submissions on the issues paper within the consultation period.

1. Introduction

1.1. Australia's biosecurity policy framework

Australia's biosecurity policies aim to protect Australia against the risks that may arise from exotic pests¹ entering, establishing and spreading in Australia, thereby threatening Australia's unique flora and fauna, as well as those agricultural industries that are relatively free from serious pests.

The import risk analysis (IRA) process is an important part of Australia's biosecurity policies. It enables the Australian Government to formally consider the risks that could be associated with proposals to import new products into Australia. If the risks are found not to achieve Australia's appropriate level of protection (ALOP), risk management measures are proposed to reduce the risks to an acceptable level. But, if it is not possible to reduce the risks to an acceptable level, then no trade will be allowed.

Successive Australian Governments have maintained a conservative, but not a zero-risk, approach to the management of biosecurity risks. This approach is expressed in terms of Australia's ALOP, which reflects community expectations through government policy and is currently described as providing a high level of protection aimed at reducing risk to a very low level, but not to zero.

Australia's IRAs are undertaken by Biosecurity Australia using teams of technical and scientific experts in relevant fields, and involving consultation with stakeholders at various stages during the process. The recommendations from Biosecurity Australia are provided to the Director of Animal and Plant Quarantine (the Secretary of the Australian Department of Agriculture, Fisheries and Forestry), who is responsible for determining whether or not an importation can be permitted under the *Quarantine Act 1908*, and if so, under what conditions. The Australian Quarantine and Inspection Service (AQIS) is responsible for implementing the import protocol, including any risk management measures.

More information about Australia's biosecurity framework is provided in the *Import Risk Analysis Handbook 2007* located on the Biosecurity Australia website www.biosecurityaustralia.gov.au.

1.2. Purpose

The primary purpose of this issues paper is to provide information to stakeholders about the import risk analysis (IRA) for fresh apple fruit from the People's Republic of China (China). The issues paper is the first step towards identifying the issues relevant to the IRA. The information in this document is intended to assist stakeholders to contribute to the IRA process.

1.3. Background of access request

The State Administration for Entry–Exit Inspection and Quarantine of the People's Republic of China (CIQSA), now known as the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ), requested market access to Australia for fresh apple fruit in 2001.

¹ A pest is any species, strain or biotype of plant, animal, or pathogenic agent injurious to plants or plant products (FAO 2007b).

Initially, access was sought for production areas in the provinces of Shaanxi (CIQSA 2001a) and Shandong (CIQSA 2001b). In 2004 AQSIQ requested that the production areas be extended to cover the provinces of Hebei and Liaoning, and then in 2005, all production areas throughout China (AQSIQ 2005).

Previous risk analyses for the importation of pears from China have contributed to the substantial preliminary work undertaken on this IRA. This work will be taken into account where appropriate.

1.4. Administration

1.4.1. Timetable

Biosecurity Australia (BA) announced the formal commencement of an IRA under the regulated IRA process to consider a proposal to import apple fruit from the People's Republic of China on 17 March 2008. The analysis will be undertaken as an expanded IRA, requiring completion within 30 months from announcement. As indicated substantial preliminary work has been conducted and BA expects to complete the IRA in less than 30 months.

1.4.2. Scope

The scope of this IRA is to consider quarantine risks that may be associated with the importation of commercially produced fresh apple fruit, free of trash, from China into Australia. This IRA pertains to all commercial apple-producing provinces, and all commercially produced apple cultivars, in China.

1.4.3. Method

The method employed for preparing the draft IRA report for apples from China will be qualitative. The IRA methodology used by BA has been published in recent IRAs and is consistent with International Standards for Phytosanitary Measures (ISPMs) including ISPM 2: *Framework for pest risk analysis* (FAO 2007a) and ISPM 11: *Pest risk analysis for quarantine pests, including analysis of environmental risks and living modified organisms* (FAO 2004).

For pests relevant to this IRA that have been assessed in previous import policies, BA will assess whether the existing policies are appropriate to the quarantine risk for apples from China.

1.4.4. Consultation

Biosecurity Australia Policy Memorandum 2007/20 of 12 September 2007 advised stakeholders that changes to the IRA process had been implemented on 5 September 2007 when regulations made under the *Quarantine Act 1908* formally took effect. That advice also notified the transitional arrangements for Biosecurity Australia's import work program which includes apples from China.

This issues paper is released for comment and consultation with stakeholders as part of the process for an expanded IRA. Under the Quarantine Regulations 2000, stakeholders will have up to 60 days to submit written comments. Biosecurity Australia may meet with stakeholders to discuss matters raised in their submissions.

There will also be a 60 day consultation period to comment on the draft IRA report.

1.5. Expert panel

An expert panel is being formed to assist BA with this analysis throughout the process.

The purpose of the expert panel will be to:

- assist BA examine and review scientific issues relevant to the IRA
- provide advice regarding the provisional conclusions in risk analysis documents being drafted
- provide guidance to BA scientists in areas of particular scientific expertise.

The expert panel will comprise:

Professor David Guest	Plant Pathology, Faculty of Agriculture, Food and Natural Resources, University of Sydney
Professor John Irwin	Molecular Plant Sciences, Faculty of Biological and Chemical Sciences, University of Queensland
Mr Barry Philp	Former Director, Horticulture Industry Development, Primary Industries and Resources South Australia.

1.6. Existing policy

Import policy exists for Fuji apples from Japan (AQIS 1998a) and apples from New Zealand (BA 2006). No apples have been imported into Australia under these policies.

Import policies also exist for ya pears and Asian pears from China's provinces of Hebei, Shandong and Shaanxi (AQIS 1998b; BA 2003; BA 2005) and fragrant pears from Xinjiang Uygur Autonomous Region (BA 2005).

Trade in ya pears from Hebei commenced in 1999 and from Shandong in 2000. Asian pears were imported from Shandong since 2003, and Asian pears from Hebei and fragrant pears from Xinjiang since 2005. There has not been any trade in pears from Shaanxi. Volumes of pear imports from China were 4172 tonnes in 2005, 3267 tonnes in 2006 and 3686 tonnes in 2007 (ABS 2008).

Although of limited biosecurity concern, Australia imports some apple products from China. Import of apple juice concentrate from China over the past three years was 26 million litres in 2005, 23 million litres in 2006 and 26.6 million litres in 2007 (ABS 2008). From 2005 to 2007, the volume of import of dried apples to Australia from China ranged from 375 to 654 tonnes per year (ABS 2008). Apple pulp is also imported from China for processing.

2. Apple industry in China

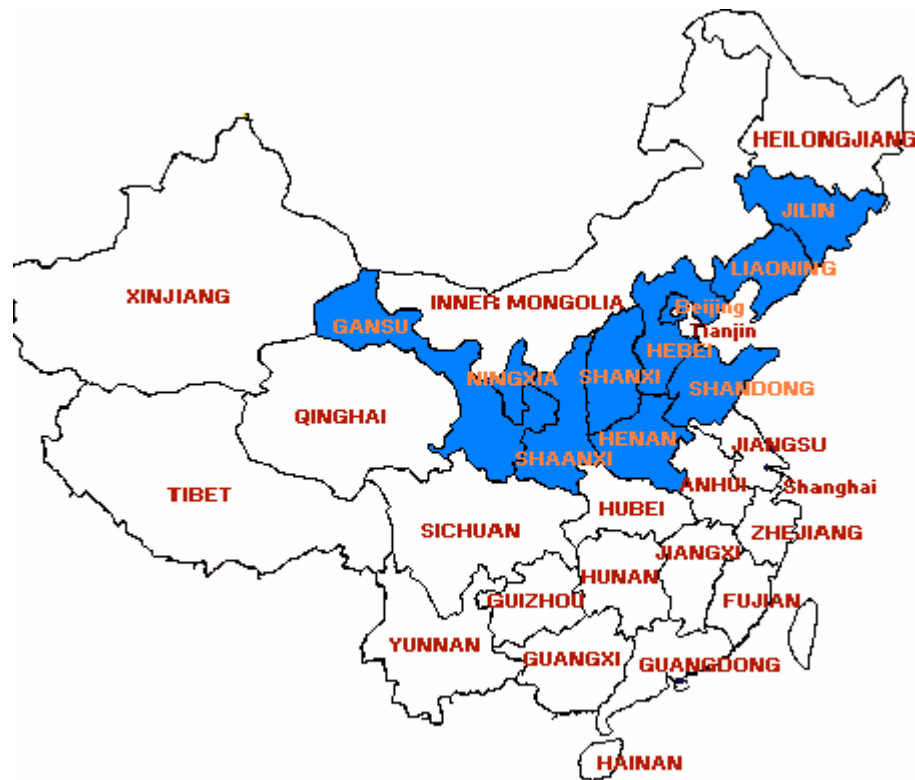
2.1. Production

It is generally accepted that the primary centre of origin for apple (*Malus*) is within the region which includes Asia Minor, the Caucasus, Russian Central Asia and Himalayan India and Pakistan (Watkins 1976).

China is the world's largest producer and consumer of apples, accounting for approximately 50% of global apple production (Branson *et al.* 2004). In 2005, 25 006 500 metric tons (MT) of apples were produced from 2 200 625 ha, with an average yield of 11.36 MT/ha (FAOSTAT 2006). In 2006, China harvested a record of 26 million MT of apples and it was estimated that 23 million MT would be produced in 2007 (Wu *et al.* 2007).

China's main deciduous fruit production areas are in the Bohai Gulf, the Northwest Loess Plateau, and the northern portion of the Yellow River Basin. Apple production is concentrated in Shandong, Shaanxi, Henan, Hebei, Shanxi, Liaoning and Gansu and these provinces accounted for 86% of the planted area and 90% of China's apple production (Branson *et al.* 2004). Apart from these provinces, Beijing and Ningxia are also nominated by China as production areas (AQSIQ 2005). The main apple production areas are indicated in Figure 1.

Figure 1: Map of China: main apple production regions are located in northern China including Beijing and the provinces of Gansu, Hebei, Henan, Jilin, Liaoning, Ningxia, Shaanxi, Shandong and Shanxi



During 2003, Red Fuji apples accounted for approximately 61% of China's total apple harvest. Approximate harvesting times for commonly cultivated varieties in China are: Gala in late August, New Red Star in late September, Qinguan in early October and Red Fuji in the middle of October (AQSIQ 2005).

2.2. Exports

China exports only a small proportion of its total apple production yield; over the two year period 2003/04 and 2004/05 only 3.5% of production was exported. Exports of fresh apple fruit increased from 181 000 MT in 1999 to 774 000 MT in 2004 (Zeitner 2006), 823 988 MT in 2005 and 804 318 MT in 2006 (Wu *et al.* 2007). In 2007, the volume of apple exports was expected to decrease because of tightened supplies and higher prices, coupled with more stringent control over exported fruit by AQSIQ (Wu *et al.* 2007).

In 2004, China exported fresh apple fruit to 74 countries, but 10 countries accounted for 74% of all exports. Russia is the largest single export market with approximately 113 000 MT of apples exported during 2004, followed by Vietnam with 95 000 MT (Zeitner 2006). Other major export markets include Canada, Indonesia, Malaysia, the Philippines, Singapore and Thailand. More recent markets include Argentina, Chile, Peru and Mexico (AQSIQ 2005). Apples are also exported to the European Union.

2.3. Overview of cultivation and processing practices

Limited in-field mechanisation permits relatively high planting densities and use of slopes that would be unsuitable for mechanised access. Apple production in China is relatively labour intensive with pollination, bud thinning, pesticide and fertiliser applications commonly performed by hand (Zeitner 2006).

In China, bagging of fruits (Figure 2) is a routine practice for the production of export quality apple fruit, to provide protection from insects and diseases. Bagging also reduces the need for agrochemical inputs and minimises chemical residues. Bags may be placed on young developing fruit, and removed two to four weeks prior to harvest, to permit fruit colour development (AQSIQ 2008).

Other commercial export apple orchard management practices include tree pruning and training, irrigation, fertiliser application and pest management. Most orchards are maintained with sweet clover or other green manure crops to retain moisture and improve soil quality (AQSIQ 2005).

Figure 2: Double bags used for bagging of apple fruit in China (left) and bagged fruit in apple orchard (right).



Harvested apple fruit is washed, waxed, dried, inspected for quality and graded. Bagged fruit may not be washed unless requested by importing countries. Apples are usually maintained under controlled humidity and temperature (e.g. 0–1 °C) conditions. Transportation from the packhouse may occur in refrigerated containers (AQSIQ 2005).

Controlled atmosphere and refrigeration is used to extend the supply season. The Chinese apple export season commences primarily from September onwards and continues with stored fruit to the following May (AQSIQ 2005).

3. Pests associated with apple production in China

3.1. Pest list

Pests identified as associated with apple production in China are listed in Appendix A. The list was compiled from pest lists for apples provided by China and searches of the international scientific literature and databases. Many of the pests are also associated with pear production in China. Biosecurity Australia welcomes any additional information that may be received from stakeholders. The final list will form the basis of the pest categorisation process within the risk analysis.

3.2. Fire blight status in China

Prior to the commencement of the IRA, a number of stakeholders have expressed their views to BA about the status of fire blight in China.

Fire blight, caused by the bacterium *Erwinia amylovora* (Burrill) Winslow et al., is an internationally recognised and significant plant disease affecting pome fruit (CAB International 2007). Fire blight is not present in Australia and it is a quarantine pest for Australia.

The status of fire blight was investigated when Australia was considering China's request for access for ya pears from Hebei and Shandong provinces (AQIS 1998b). Fire blight had previously been recorded in China with the most recent report being 1959, however internationally recognised researchers indicate these reports to be from unconfirmed records and fire blight is not considered to be present (van der Zwet 1996; van der Zwet and Keil 1979). Australian plant pathologists visited the pear production areas in 1997 and 1998 and found no evidence that fire blight was present in the provinces. Initial policy required that China continue to demonstrate area freedom by surveying for this disease in production areas. Monitoring requirements and pre-clearance audits since the commencement of trade in 1999 provided confidence that fire blight was not present in the export areas.

China maintains that fire blight is not present in the country and it is a quarantine pest for China. An Australian plant pathologist visited additional pear production areas in Xinjiang and Shaanxi in 2005. Fire blight was removed from the pest list for pears and currently Australia does not require any specific measures for fire blight for the import of pears. China is required to notify Australia immediately if any exotic disease of quarantine concern to Australia including fire blight is detected (BA 2005).

Early in 2008, AQSIQ provided BA with a report of a biannual, three-year orchard survey (2005-2007) and laboratory testing for fire blight in apple and pear production areas of Shaanxi, Hebei and Shandong. The surveys and testing concluded that no fire blight had been found (AQSIQ 2008).

Biosecurity Australia will review available information to confirm that China remains free of fire blight.

4. Further steps in the import risk analysis process

The draft IRA report is expected to be issued in the third quarter of 2008, although this timing will depend on the nature and extent of any comments and submissions from stakeholders on this issues paper.

Completion of this IRA will be in accordance with the IRA Handbook and will therefore involve the following key steps:

- consultation on issues paper (60 days)
- risk analysis and preparation of a draft IRA report
- consultation on draft IRA report (60 days)
- consideration of stakeholder submissions and preparation of a revised draft IRA report
- review of revised draft IRA report by the Eminent Scientists Group
- preparation and publication of provisional final IRA report (*end of regulated timeframe*)
- opportunity to appeal on the provisional final IRA report
- if there are no appeals, or at the conclusion of the appeal process, BA will provide the final IRA report and a recommendation for a policy determination to the Director of Animal and Plant Quarantine
- consideration of the final report and its recommendations by the Director of Animal and Plant Quarantine
- determination of the policy
- publication of the final IRA report.

Biosecurity Australia is committed to a thorough risk analysis of the proposal to import fresh apple fruit from China. This analysis requires that technical information be gathered from a wide range of sources. This paper is being issued to give all interested parties an opportunity to comment on issues relevant to the analysis. If you have relevant information you would like to have considered as part of this analysis, it should be submitted to Biosecurity Australia by 5 September 2008.

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Appendix A: Pest list – apples from China

Note: species marked with an asterisk (*) are also associated with pears in China.

Scientific name	Common name/s
ARTHROPODS	
ACARI	
<i>Amphitetranychus viennensis</i> (Zacher, 1920)* Synonym: <i>Tetranychus viennensis</i> Zacher, 1920 [Acari: Tetranychidae]	hawthorn spider mite
<i>Bryobia rubrioculus</i> (Scheuten, 1857)* [Acari: Tetranychidae]	<i>Bryobia</i> mite; brown apple mite
<i>Cenopalpus pulcher</i> (Canestrini & Fanzago, 1876) [Acari: Tenuipalpidae]	flat scarlet mite
<i>Eotetranychus pruni</i> (Oudemans, 1931)* [Acari: Tetranychidae]	spider mite
<i>Panonychus ulmi</i> (Koch, 1836)* [Acari: Tetranychidae]	European red mite
<i>Tetranychus urticae</i> Koch, 1836* [Acari: Tetranychidae]	two-spotted spider mite
COLEOPTERA	
<i>Agrilus mali</i> Matsumura, 1924* [Coleoptera: Buprestidae]	apple wood borer
<i>Anomala corpulenta</i> Motschulsky, 1853* [Coleoptera: Scarabaeidae]	scarab beetle
<i>Anoplophora chinensis</i> (Forster, 1771) [Coleoptera: Cerambycidae]	star longicorn beetle
<i>Anoplophora glabripennis</i> (Motschulsky, 1853)* Synonym: <i>Anoplophora angustata</i> Pic, 1834; <i>Anoplophora laevigator</i> (Thomson, 1857); <i>Anoplophora laglaisei</i> Pic, 1953 [Coleoptera: Cerambycidae]	Asian long-horned beetle
<i>Anoplophora nobilis</i> Ganglbauer [Coleoptera: Cerambycidae]	longhorn beetle
<i>Apriona germari</i> (Hope, 1831)* [Coleoptera: Cerambycidae]	long-horned stem borer
<i>Bacchisa fortunei</i> (Thomson, 1857)* Synonym: <i>Chreonoma fortunei</i> (Thomson, 1857) [Coleoptera: Cerambycidae]	blue pear twig borer; pear borer
<i>Holotrichia scrobiculata</i> Kiesenwetter, 1857 [Coleoptera: Scarabaeidae]	scarab beetle
<i>Lamprodila limbata</i> (Gebler, 1832)* Synonym: <i>Lampra limbata</i> Gebler, 1832 [Coleoptera: Cerambycidae]	golden jewel beetle

Scientific name	Common name/s
<i>Linda fraterna</i> (Chevrolat, 1852) [Coleoptera: Cerambycidae]	apple branch longicorn beetle
<i>Protaetia brevitarsis</i> Lewis, 1879* [Coleoptera: Scarabaeidae]	white-spotted flower chafer
<i>Gametis jucunda</i> (Faldermann, 1835)* [Coleoptera: Scarabaeidae]	citrus flower chafer
<i>Proagopertha lucidula</i> (Faldermann, 1835)* [Coleoptera: Scarabaeidae]	Lucidula chafer; apple fairy chafer
<i>Rhynchites auratus</i> (Scopoli, 1763) [Coleoptera: Rhynchitidae]	apricot weevil
<i>Rhynchites heros</i> Roelofs, 1874* Synonym: <i>Rhynchites foveipennis</i> Fairmaire; <i>Rhynchites ignites</i> Legalov; <i>Rhynchites coreanus</i> Legalov [Coleoptera: Rhynchitidae]	Japanese pear weevil
<i>Maladera orientalis</i> (Motschulsky, 1857)* [Coleoptera: Scarabaeidae]	smaller velvety chafer
DIPTERA	
<i>Bactrocera dorsalis</i> (Hendel, 1912)* [Diptera: Tephritidae]	Oriental fruit fly
HEMIPTERA	
<i>Aphidounguis mali</i> Takahashi, 1963 [Hemiptera: Pemphigidae]	root aphid
<i>Aphis pomi</i> De Geer, 1773 [Hemiptera: Aphididae]	green apple aphid
<i>Aphis spiraecola</i> Patch, 1914* Synonym: <i>Aphis citricola</i> Van der Goot [Hemiptera: Aphididae]	apple aphid; brown citrus aphid; green citrus aphid
<i>Ceroplastes japonicus</i> Green, 1921* [Hemiptera: Coccidae]	Japanese wax scale
<i>Cicadella viridis</i> (Linnaeus, 1758)* As <i>Tettigella viridis</i> Linnaeus in AQSIQ (2005). [Hemiptera: Cicadellidae]	green leafhopper
<i>Cryptotympana pustulata</i> (Fabricius 1787)* [Hemiptera: Cicadidae]	blackish cicada
<i>Diaspidiotus ostreaeformis</i> (Curtis, 1843) [Hemiptera: Diaspididae]	oystershell scale; pear oyster scale
<i>Diaspidiotus perniciosus</i> (Comstock, 1881)* [Hemiptera: Diaspididae]	California scale; San Jose scale
<i>Drosicha corpulenta</i> (Kuwana, 1902)* [Hemiptera: Margarodidae]	giant mealybug

Scientific name	Common name/s
<i>Empoasca flavescens</i> (Fabricius, 1794)* [Hemiptera: Cicadellidae]	small green leafhopper
<i>Eulecanium kunoense</i> (Kuwana, 1907)* Synonym: <i>Lecanium kunoensis</i> ; <i>Coccus kunoensis</i> [Hemiptera: Coccidae]	globular peach scale; peach firm scale; soft scale
<i>Eriosoma lanigerum</i> (Hausmann, 1802) [Hemiptera: Aphididae]	woolly aphid
<i>Erthesina fullo</i> (Thunberg, 1783) [Hemiptera: Pentatomidae]	yellow spot stink bug
<i>Erythroneura apicalis</i> (Nawa, 1913)* [Hemiptera: Cicadellidae]	grape leafhopper
<i>Halyomorpha halys</i> Stål, 1855* [Hemiptera: Pentatomidae]	yellow-brown stink bug; tree stink bug
<i>Lygus lucorum</i> Meyer-Dür, 1843 [Hemiptera: Miridae]	mirid bug
<i>Nephotettix cincticeps</i> (Uhler, 1896) [Hemiptera: Cicadellidae]	common leafhopper
<i>Ovatus malisuctus</i> (Matsumura, 1918) Synonym: <i>Myzus malisuctus</i> Matsumura [Hemiptera: Aphididae]	apple gall aphid; apple leaf-curling aphid
<i>Prociphilus aurus</i> Zhang & Qiao, 1997 [Hemiptera: Pemphigidae]	woolly aphid
<i>Pseudococcus calceolariae</i> (Maskell, 1879) [Hemiptera: Pseudococcidae]	citrophilius mealybug
<i>Pseudococcus comstocki</i> (Kuwana, 1902)* [Hemiptera: Pseudococcidae]	Comstock's mealybug
<i>Rhodococcus sariuoni</i> Borchsenius, 1955* [Hemiptera: Coccidae]	coccid scale
<i>Ricania speculum</i> (Walker, 1851) [Hemiptera: Ricaniidae]	black leafhopper
<i>Sphaerolecanium prunastri</i> (Boyer de Fonscolombe, 1834)* [Hemiptera: Coccidae]	blackthorn scale
<i>Stephanitis nashi</i> Esaki & Takeya, 1931* [Hemiptera: Tingidae]	pear lace bug
<i>Urochela luteovaria</i> Distant, 1881 [Hemiptera: Urostylidae]	pear stink bug
HYMENOPTERA	
<i>Hoplocampa pyricola</i> Rohwer, 1924* [Hymenoptera: Tenthredinidae]	pear fruit sawfly
<i>Vespa mandarina</i> Smith, 1852 [Hymenoptera: Vespidae]	Asian giant hornet

Scientific name	Common name/s
LEPIDOPTERA	
<i>Acleris fimbriana</i> (Thunberg, 1791)* [Lepidoptera: Tortricidae]	fruit tree tortrix
<i>Acrocercops astaurota</i> Meyrick, 1922* [Lepidoptera: Gracilariidae]	pear bark miner
<i>Acronicta increta</i> Morrison, 1974* Syns: <i>Acronicta inermidia</i> (Warren); <i>Triaena intermedia</i> [Lepidoptera: Noctuidae]	apple dagger moth; raspberry bud moth
<i>Acronicta rumicis</i> (Linnaeus, 1758)* [Lepidoptera: Noctuidae]	knotgrass moth
<i>Acronicta strigosa</i> (Denis & Schiffermüller, 1775) [Lepidoptera: Noctuidae]	cherry dagger moth
<i>Actias selene ningpoana</i> Felder & Felder, 1862* [Lepidoptera: Saturniidae]	green actias moth
<i>Adoxophyes orana</i> (Fischer von Roeslerstamm, 1834)* [Lepidoptera: Tortricidae]	summer fruit tortrix; smaller tea tortrix; summer fruit tortrix moth
<i>Anarsia lineatella</i> Zeller, 1839 [Lepidoptera: Tineidae]	tineid moth
<i>Apocheima cinerarium</i> (Erschov, 1874) [Lepidoptera: Geometridae]	geometrid moth
<i>Apocheima</i> sp. [Lepidoptera: Geometridae]	geometrid moth
<i>Aporia crataegi</i> (Linnaeus, 1758)* Synonym: <i>Aporia nigronervosus</i> (Retzius) [Lepidoptera: Pieridae]	blackveined white butterfly
<i>Archips brevipicanus</i> Walsingham, 1900 [Lepidoptera: Tortricidae]	Asiatic leafroller
<i>Archips xylosteanus</i> (Linnaeus, 1758)* [Lepidoptera: Tortricidae]	apple variegated tortrix; apple leafroller
<i>Carposina sasakii</i> Matsumura, 1900* Synonym: <i>Carposina niponensis</i> Walsingham [Lepidoptera: Carposinidae]	peach fruit borer; peach fruit moth
<i>Choristoneura longicellana</i> (Walsingham, 1900) [Lepidoptera: Tortricidae]	common apple leaf roller
<i>Clania variegata</i> (Snellen, 1879) [Lepidoptera: Pyralidae]	cotton bag worm; Paulownia bagworm
<i>Coleophora nigricella</i> Stephens, 1834 [Lepidoptera: Coleophoridae]	coleophorid moth
<i>Cydia pomonella</i> Linnaeus, 1758* [Lepidoptera: Tortricidae]	codling moth

Scientific name	Common name/s
<i>Dichocrocis punctiferalis</i> Guenée, 1854* [Lepidoptera: Crambidae]	yellow peach moth; crambid moth
<i>Eublemma pariana</i> (Clerck, 1759) Synonym: <i>Anthophila pariana</i> Clerck [Lepidoptera: Noctuidae]	apple-and-thorn skeletonizer
<i>Eudocima tyrannus</i> (Guenée, 1852) [Lepidoptera: Noctuidae]	noctuid moth
<i>Euproctis similis</i> (Fuessly, 1775)* [Lepidoptera: Lymantriidae]	browntail moth; yellowtail moth; mulberry tussock moth
<i>Porthesia similis xanthocampa</i> (Dyar, 1905) [Lepidoptera: Lymantriidae]	browntail moth; yellowtail moth
<i>Euzophera pyriella</i> Yang, 1994* [Lepidoptera: Pyralidae]	pyralid moth
<i>Grapholita funebrana</i> (Treitschke, 1835) Synonym: <i>Grapholitha funebrana</i> Treitschke [Lepidoptera: Tortricidae]	plum fruit moth; red plum maggot
<i>Grapholita inopinata</i> (Heinrich, 1928)* [Lepidoptera: Tortricidae]	Manchurian fruit moth
<i>Grapholita molesta</i> (Busck, 1916)* [Lepidoptera: Tortricidae]	Oriental fruit moth; Oriental peach moth
<i>Helicoverpa armigera</i> (Hübner, 1805)* [Lepidoptera: Noctuidae]	cotton bollworm
<i>Hyphantria cunea</i> (Drury, 1773) [Lepidoptera: Arctiidae]	fall webworm
<i>Hypocala subsatura</i> Guenée, 1852 [Lepidoptera: Noctuidae]	noctuid moth
<i>Illiberis pruni</i> Dyar, 1905* [Lepidoptera: Zygaenidae]	green cochlid; pear spotted caterpillar; pear leaf worm
<i>Leucoptera scitella</i> (Zeller, 1839)* Synonym: <i>Leucoptera malifoliella</i> (Costa) [Lepidoptera: Lyonetiidae]	pear leaf miner; apple leaf miner
<i>Lymantria dispar</i> (Linnaeus, 1759)* [Lepidoptera: Lymantriidae]	Asian gypsy moth
<i>Malacosoma neustria testacea</i> Motschulsky, 1861* [Lepidoptera: Lasiocampidae]	tent caterpillar
<i>Marumba gaschkewitshi</i> Bremer & Grey, 1852 Includes three sub-species: <i>Marumba gaschkewitshii</i> <i>carstanjeni</i> , Staudinger, 1887 (Staudinger); <i>Marumba</i> <i>gaschkewitshii complacens</i> Walker, 1864; <i>Marumba</i> <i>gaschkewitshi gaschkewitshii</i> Bremer et Grey, 1852 [Lepidoptera: Sphingidae]	peach horn worm

Scientific name	Common name/s
<i>Monema flavescens</i> (Walker, 1855)* [Lepidoptera: Heterogeneidae]	Oriental fruit moth
<i>Odites issikii</i> (Takahashi, 1930) [Lepidoptera: Lecihoceridae]	tube caterpillar
<i>Odonestis pruni</i> (Linnaeus, 1758)* [Lepidoptera: Lasiocampidae]	apple caterpillar
<i>Oraesia excavata</i> (Butler, 1878)* [Lepidoptera: Noctuidae]	fruit-piercing moth
<i>Orgyia antiqua</i> (Linnaeus, 1758) [Lepidoptera: Lymantriidae]	European tussock moth; scarce vaporer moth
<i>Pandemis cerasana</i> (Hübner, 1786) Synonym: <i>Pandemis ribeana</i> Hübner [Lepidoptera: Tortricidae]	barred fruit-tree tortrix
<i>Pandemis heparana</i> Denis & Schiffermüller, 1775* [Lepidoptera: Tortricidae]	apple brown tortrix; dark fruit-tree tortrix
<i>Pangrapta obscurata</i> (Butler, 1879) [Lepidoptera: Noctuidae]	limacodid moth
<i>Parasa consocia</i> Walker, 1863* [Lepidoptera: Limacodidae]	green urticating caterpillar; green cochlid
<i>Parasa hilarata</i> (Staudinger, 1887)* Synonym: <i>Latoia hilarata</i> [Lepidoptera: Limacodidae]	stinging caterpillar
<i>Parasa sinica</i> Moore, 1877 [Lepidoptera: Limacodidae]	Chinese cochlid
<i>Peridroma saucia</i> (Hübner, 1808) [Lepidoptera: Noctuidae]	pearly underwing moth
<i>Phalera flavescens</i> (Bremer & Grey, 1852)* [Lepidoptera: Noctuidae]	cherry caterpillar
<i>Phyllonorycter crataegella</i> (Clemens, 1859) As <i>Lithocolletis malivorella</i> in CIQSA (2001b) [Lepidoptera: Gracillariidae]	silver-striped moth
<i>Phyllonorycter ringoniella</i> (Matsumura, 1931)* [Lepidoptera: Gracillariidae]	apple leafminer
<i>Rhopobota unipunctana</i> (Haworth, 1811) [Lepidoptera: Tortricidae]	blackheaded fireworm
<i>Setora postornata</i> (Hampson, 1900) [Lepidoptera: Limacodidae]	brown cochlid
<i>Smerithus planus planus</i> Walker, 1856 [Lepidoptera: Sphingidae]	hawkmoth
<i>Spilonota albicana</i> (Motschulsky, 1866)* [Lepidoptera: Tortricidae]	white fruit moth; eye spotted bud moth

Scientific name	Common name/s
<i>Spilonota lechriaspis</i> Meyrick, 1932* [Lepidoptera: Tortricidae]	apple fruit licker; tipshoot tortrix
<i>Spilonota ocellana</i> (Denis & Schiffermüller, 1775) [Lepidoptera: Tortricidae]	eye-spotted bud moth; brown apple budworm
<i>Swammerdamia pyrella</i> (Villers, 1789) [Lepidoptera: Yponomeutidae]	ermine moth
<i>Synanthedon hector</i> (Butler, 1878)* [Lepidoptera: Sesiidae]	lime-tree borer; cherry tree borer
<i>Telphusa chlororderces</i> Meyrick, 1929* [Lepidoptera: Gelechiidae]	black star leaf roller
<i>Setora postornata</i> (Hampson, 1900) [Lepidoptera: Limacodidae]	limacodid moth
<i>Thosea sinensis</i> (Walker, 1855)* [Lepidoptera: Limacodidae]	coconut cup moth; nettle grub
<i>Yponomeuta malinellus</i> Zeller, 1838 [Lepidoptera: Yponomeutidae]	apple ermine moth
ORTHOPTERA	
<i>Patanga japonica</i> (Bolivar, 1898) [Orthoptera: Acrididae]	Japanese spur-throated grasshopper
<i>Deracantha onos</i> (Pallas, 1772) [Orthoptera: Bradyporidae]	grasshopper
<i>Gampsocleis ussuriensis</i> Adelung, 1910 [Orthoptera: Tettigoniidae]	katydid
<i>Gryllus testaceus</i> Walker, 1869 [Orthoptera: Gryllidae]	field cricket
<i>Loxoblemmus doenitzi</i> Stein, 1881 [Orthoptera: Gryllidae]	cricket
PATHOGENS	
BACTERIA	
<i>Rhizobium radiobacter</i> (Beijerinck & van Delden 1902) Young et al 2001* Synonym: <i>Agrobacterium tumefaciens</i> [Rhizobiales: Rhizobiaceae]	hairy root, crown gall
FUNGI	
<i>Alternaria alternata</i> (Fr.: Fr.) Keissl. [Anamorphic Pleosporaceae]	apple core rot; apple storage rot; leaf spot
<i>Alternaria mali</i> Roberts As <i>Alternaria alternata</i> f. sp. <i>mali</i> in AQSIQ (2005) and CIQSA (2001b) [Anamorphic Pleosporaceae]	apple cork spot; leaf spot; storage rot

Scientific name	Common name/s
<i>Armillaria tabescens</i> (Scop.) Dennis, Orton & Hora* [Agaricales: Phycalacriaceae]	armillaria root rot
<i>Aspergillus glaucus</i> Link: Fr. [Anamorphic Trichocomaceae]	storage fruit rot
<i>Aspergillus niger</i> Tiegh. [Anamorphic Trichocomaceae]	storage fruit rot
<i>Aspergillus ochraceus</i> K. Wilh. [Anamorphic Trichocomaceae]	storage fruit rot
<i>Athelia rolfsii</i> (Curzi) C.C. Tu & Kimbr. Synonym: <i>Sclerotium rolfsii</i> . [Polyporales: Corticiaceae]	wilt and fruit rot
<i>Botryosphaeria berengeriana</i> De Not. f. sp. <i>pyricola</i> Kogan & Sakuma* [Dothideales: Botryosphaeriaceae]	apple ring rot
<i>Botryosphaeria dothidea</i> (Moug.: Fr) Ces. & De Not.* Anamorph: <i>Fusicoccum aesculii</i> Corda Synonym: <i>Botryosphaeria berengeriana</i> [Dothideales: Botryosphaeriaceae]	apple botryosphaeria canker
<i>Botryosphaeria obtusa</i> (Schwein.) Shoemaker* Anamorph: <i>Sphaeropsis malorum</i> Berk. [Dothideales: Botryosphaeriaceae]	black rot; black canker
<i>Botrytis cinerea</i> Pers.: Fr.* [Anamorphic Sclerotiniaceae]	hui mei bing grey mould; botrytis rot
<i>Chondrostereum purpureum</i> (Pers.: Fr.) Pouzar [Poriales: Meruliaceae]	silver leaf
<i>Diaporthe eres</i> Nitschke* Anamorph: <i>Phomopsis oblonga</i> (Desm.) Traverso [Diaporthales: Diaporthaceae]	pear canker
<i>Diplocarpon mali</i> Y. Harada & Sawamura [Anamorphic Dermateaceae]	marssonina blotch; apple leaf brown rot
<i>Erythricium salmonicolor</i> (Berk. & Broome) Burds. [Poriales: Corticiaceae]	pink disease damping off
<i>Fusarium avenaceum</i> (Fr.: Fr) Sacc. Teleomorph: <i>Gibberella avenacea</i> R.J. Cook [Hypocreales: Nectriaceae]	water rot; fruit rot; collar rot
<i>Fusicladium carpophilum</i> (Thüm.) Qudem. Syn: <i>Cladosporium carpophilum</i> Thüm Teleomorph: <i>Venturia carpophila</i> E.E. Fisher [Pleosporales: Venturiaceae]	mouldy core
<i>Fusarium culmorum</i> (W.G. Sm.) Sacc. [Anamorphic Nectriaceae]	root rot

Scientific name	Common name/s
<i>Fusarium</i> sp. [Anamorphic Nectriaceae]	root rot
<i>Glomerella cingulata</i> (Stoneman) Spauld. & H. Schrenk* As <i>Colletotrichum gloeosporioides</i> (Penz.) Penz. & Sacc. in AQSIQ (2005) and CIQSA (2001) [Incertaetae sedis: Hypocreomycetidae]	anthracnose; bitter rot
<i>Gymnosporangium yamadae</i> Miyade ex G. Yamada [Uredinales: Pucciniaceae]	Japanese apple rust
<i>Helicobasidium mompa</i> Tanaka [Incertae sedis: Helicobasidiaceae]	violet root rot
<i>Leptosphaeria yulan</i> Sacc. [Pleosporales: Leptosphaeriaceae]	leaf spot
<i>Monilinia fructigena</i> Honey* Anamorph: <i>Monilia fructigena</i> Pers.:Fr. [Helotiales: Sclerotiniaceae]	brown rot
<i>Monilinia mali</i> (Takah.) [Helotiales: Sclerotiniaceae]	monilia leaf blight; apple blossom blight
<i>Nectria cinnabarina</i> (Tode: Fr.) Fr. Anamorph: <i>Tubercularia vulgaris</i> Tode: Fr. [Hypocreales: Nectriaceae]	apple canker; nectria twig blight
<i>Penicillium expansum</i> Link* [Anamorphic Trichocomaceae]	soft rot; blue mould; wet rot
<i>Phoma pomorum</i> Thum. var <i>pomorum</i> Synonym: <i>Phyllosticta pirina</i> Sacc [Anamorphic Leptosphaereaceae]	apple leaf grey spot
<i>Phyllachora pomigena</i> (Schwein.) Sacc. As <i>Marssonina mali</i> in (CIQSA 2001a) Anamorph: <i>Gloeodes pomigena</i> (Schwein.) Colby [Dothideales: Dothideaceae]	sooty blotch; apple blotch disease
<i>Phyllactinia guttata</i> Anamorph: <i>Erysiphe suffulta</i> Rebent. [Erysiphales: Erysiphaceae]	powdery mildew
<i>Phyllactinia mali</i> (Duby) U. Braun Anamorph: <i>Erysiphe mali</i> Duby [Erysiphales: Erysiphaceae]	powdery mildew
<i>Phyllosticta solitaria</i> Ellis & Everh. [Anamorphic Botryosphaeriaceae]	apple blotch; apple leaf round spot
<i>Pleospora herbarum</i> (Pers.: Fr.) Rabenh. Anamorph: <i>Stemphylium herbarum</i> E.G. Simmons [Pleosporales: Pleosporaceae]	pleospora rot; leaf spot

Scientific name	Common name/s
<i>Podosphaera leucotricha</i> (Ellis & Everh.) E. S. Salmon* Anamorph: <i>Oidium mespili</i> Cooke [Erysiphales: Erysiphaceae]	powdery mildew of apple
<i>Rhizopus stolonifer</i> (Ehrenb. ex Fr.) Vuill. [Mucorales: Mucoraceae]	rhizopus rot
<i>Rosellinia necatrix</i> Prill.* Anamorph: <i>Dematophora necatrix</i> R. Hartic [Xylariales: Xylariaceae]	pear tree white root rot; dematophora root rot
<i>Schizophyllum commune</i> Fr.: Fr. [Agaricales: Schizophyllaceae]	heart rot; heartwood rot; wood rot
<i>Schizothyrium pomi</i> (Mont. & fr.) Arx* Anamorph: <i>Zygophiala jamaicensis</i> E.W. Mason ex Whetzel Synonym: <i>Leptothyrium pomi</i> [Microthyriales: Schizothyriaceae]	apple fly speck
<i>Septobasidium bogoriense</i> Pat. [Septobasidiales: Septobasidiaceae]	felted fungus
<i>Trichothecium roseum</i> (Pers.: Fr.) Link* [Anamorphic Bionectriaceae]	apple pink rot; pink mould rot
<i>Valsa ceratosperma</i> (Tode: Fr.) Maire* Anamorph: <i>Cytospora sacculus</i> (Schwein.: Fr.) Gvrit. As <i>Valsa mali</i> in CIQSA (2001b) [Diaporthales: Valsaceae]	valsa canker; dieback of apple
<i>Venturia inaequalis</i> (Cooke) G. Winter Anamorph: <i>Fusicladium pomi</i> (Fr.: Fr.) [Pleosporales: Venturiaceae]	apple scab; black spot
NEMATODE	
<i>Pratylenchus</i> spp. [Tylenchida: Pratylenchidae]	apple tree root lesion nematode
STRAMINOPIILA	
<i>Phytophthora cactorum</i> (Lebert & Cohn) Schröter [Pythiales: Pythiaceae]	fruit rot; root rot; collar rot; crown rot
<i>Phytophthora cambivora</i> (Petri) Buisman [Pythiales: Pythiaceae]	root rot; collar rot; crown rot
VIROID	
Apple scar skin viroid* [Pospiviroidae: Capillovirus]	apple dimple; pear rusty skin disease
VIRUSES	
Apple mosaic virus [Bromoviridae: Ilarvirus]	apple mosaic virus
Apple chlorotic leaf spot virus [Flexiviridae: Trichovirus]	apple chlorotic leaf spot virus

Scientific name	Common name/s
Apple stem grooving virus [Flexiviridae: Capillovirus]	apple stem grooving virus
Apple stem pitting virus [Flexiviridae: Foveavirus]	apple stem pitting virus