



Australian apple export manual: a guide for exporting apples

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Abbreviations

AA	Approved Arrangements	NSW	New South Wales
AD	Additional Declaration	PC	Phytosanitary Certificate
APVMA	Australian Pesticides and Veterinarian Medicines Authority	QA	Quality Assurance
CA	Controlled Atmosphere	QT	Quarantine Tasmania
CAGR	Compound Annual Growth Rate	Qld	Queensland
DAWR	Department of Agriculture and Water Resources	RFP	Request for Permit
EXDOC	Export Documentation System	SA	South Australia
FGT	Fruit Growers Tasmania	SQF	Safe Quality Food
FOB	Free On Board	Tas	Tasmania
IP	Import Permit	USFDA	United States Food and Drugs Administration
MRL	Maximum Residue Limit	Vic	Victoria
MICoR	Manual of Importing Country Requirements	WA	Western Australia
		WHP	Withholding Period

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1 Export Overview

1.1 Industry overview

Apples are grown in all Australian States. The major production areas include Stanthorpe in Queensland; Batlow and Orange in New South Wales; the Goulburn Valley, Gippsland, Yarra Valley and the Mornington Peninsula in Victoria; the Huon Valley and North West in Tasmania; Adelaide Hills in South Australia; and Donnybrook and Manjimup in Western Australia (Figure 1). Apples are mainly produced in the southern areas of the country that experience cooler winter temperatures. The summer temperatures are often very warm but the autumn climates during the months leading up to harvest usually feature cooler nights; these weather conditions favour good fruit colour and promote flavour development. The Stanthorpe region is the most northerly region but its higher altitude (850 m) provides it with a temperate climate.

The total planted area of apples in 2016 is estimated to be 9,460 hectares. Whilst there has been no significant change in the total planted area over the last 12 months, the composition of cultivars continues to evolve in response to changing consumer preferences. Traditional apple cultivars such as Sundowner, Golden Delicious and Delicious continue to be replaced with new licensed cultivars such as Jazz™, Kanzi™ and high-coloured strains of Cripps Pink and Gala. Orchardists are also planting small areas of new cultivars such as Aztec™, Bravo™, Envy™, Eve™, Kalei™, Modi™, Rocket™, and Smitten™.

Australian apple harvesting occurs between February and May each year. Due to advances in apple storage technology, apples can be stored for many months of the year without losing freshness, appearance and eating quality. The opportunity for prolonged storage enables apple producers to maintain supplies of fruit on hand and sort, pack and transport fruit in response to domestic and export customers year-round.



1 Export Overview (cont.)



Figure 1. Australian apple production regions.

Map courtesy of Nisson R, Bound S, Adhikari R, and Cover I (2018). *Factors affecting post-harvest management of apples: a guide to optimising quality.*

Key to growing regions:

Tasmania

1. North West (Spreyton)
2. Tamar Valley
3. Huon Valley

Victoria

4. Harcourt
5. Bacchus Marsh
6. Mornington Peninsula
7. Yarra Valley
8. Gippsland
9. Goulburn Valley
10. North East

South Australia

11. Adelaide Hills

Western Australia

12. Perth Hills
13. Pickering Brook
14. Donnybrook
15. Manjimup

New South Wales

16. Orange
17. Bilpin
18. Batlow

Queensland

19. Stanthorpe

1.2 Market value

In the 2014-2015 season, Australian apple production was 311,758 tonnes with a value of \$507.4 million, making it the highest value fruit industry in Australia (Hort Innovation 2016). The majority of apples produced in Australia are consumed domestically as fresh fruit. Apples are available year round in Australia through the use of controlled atmosphere cold storage technology. Some 90% of Australian households purchased apples in the year ending June 2015, buying an average of 890 g of apples per shopping trip. Average apple consumption per capita for the year ending June 2015 was 9.1 kg per year. The fresh supply of apples had a wholesale value of \$572m. Fruit processing is the second largest consumer of Australian apples, purchasing approximately 30% of total production in the year ending June 2015.

The Australian apple industry is reaching saturation point in the domestic market, hence to ensure that the industry can continue to evolve and remain economically viable there is a critical need to encourage producers to target export markets. Exports of Australian apples currently account for less than 2% of annual fruit production. In 2016, apple exports exceeded 5,200 tonnes (analysis of ABS data by Fresh Intelligence), the highest export tonnage since 2006. In contrast, apple exports in 2015 were only 2,134 tonne (0.7% of production). Supporting this potential is the Tasmanian apple growers and their contribution to a targeted export potential level set under the Joint Tasmania Commonwealth Economic Council of \$750m in exports by 2020.

1.3 Opportunities and challenges for apple export growth

Domestic market apple prices in Australia are highly sensitive to the level of production. In years of high production, the market rate falls sharply. As a result, increasing the export capability of the Australian apple industry is a necessity, rather than a choice. Some of the factors likely to influence the expansion and success of Australian apple exports are listed in Table 1 and are discussed below.

Table 1. Opportunities and challenges likely to influence the expansion of Australia's apple exports.

Opportunities	Opportunities
Increasing trade access	High production cost
Increasing global demand	Exchange rate fluctuation
Premium value in global market	Sensitive to market exchange rates
International product recognition	Increased competition in established markets
A global leader in food safety	Strict regulatory requirements from importing countries
Government support incentives	Restricted to niche markets
	Distance from major markets

Opportunities

Australia has a trade policy that is characterised by trade openness, improving market access overseas and international competitiveness (WTO 2015). This trade policy is favourable for Australian exporters. In order to promote export, policies aimed at reducing costs, minimising regulatory requirements, encouraging investment and support services are continuously put forward. Australia is also in the process of becoming a signatory to the Trans-Pacific Partnership (TPP) agreement, which represents a free trade agreement (FTA) with other

1 Export Overview (cont.)

signatory nations throughout the Asia-Pacific region. At this time of writing, the United States of America (USA) has opted out of the Trans-Pacific Partnership Agreement, which may provide signatories like Australia with a competitive advantage over non-signatory members in Asian (Indonesia, Malaysia, Singapore) and United Kingdom (UK) markets.

Australia is already an agricultural trade partner to both China and India, two of the most highly populated countries in the world and both large producers of apples, however their domestic production is short of total demand. As a result, both countries import huge quantities of apples. China is Australia's number one trade partner and the two countries have entered into FTAs. Australia is negotiating a similar trade agreement with India. FTAs provides an opportunity to promote premium apple export to these countries.

China and India are also currently experiencing a rapid demographic change and rise of middle income population; this section of the population looks for safe, premium food which aligns with the 'clean, green and safe' image of Australian agricultural production systems. In these markets the current unit value of Australian apples is higher than key competitors, indicating that consumers in these countries have a preference towards Australian apples due to consumer awareness of Australia's high regulatory standards for food safety, human health and environmental awareness. For this reason, increases in the middle-income population in China and India offer a major source of opportunity for Australian apple exporters.

The UK is another traditional trade partner of Australia presenting opportunities for further market growth in the face of Brexit (withdrawal of the UK from the European Union (EU)). The UK is already Australia's largest trading partner for apple exports in terms of value and volume of Australian apple export in 2016/17. In the long term, the most likely scenario is that EU countries would be exposed to some market barriers, which would increase competitiveness of non-European exporters such as Australia. In this scenario, Australian exporters will need to compete against countries such as New Zealand, South Africa and USA. In the short term, the UK Pound experienced a rapid depreciation in the immediate aftermath of Brexit election vote, which has made it more difficult for Australian exporters to compete within this market (Hort Innovation 2016).

Australia's geographic location can also benefit apple producers exporting to nearby nations. Papua New Guinea (PNG) and Indonesia rank second and third most valuable countries in terms of Australian apple exports in 2016/17. With their geographical proximity to Australia, markets in these countries present continuous growth opportunities for Australian exporters. Gulf nations such as the United Arab Emirates (UAE), Qatar and Saudi Arabia, although historically not very significant importers, always present opportunities for exporters of premium quality apples, as importing is the only available option in these countries to meet domestic apple consumption.

A source of opportunity extends from the support systems provided by the Australian Government and Horticulture Innovation Australia Ltd (Hort Innovation) to promote apple export. Hort Innovation is a grower-owned Research and Development Corporation (funded by apple growers and the Australian Government) that has set a target of increasing the export of apples from less than 1% to 5%, by 2021 (in its current strategic plan – Hort Innovation 2017b). Australian Government and Hort Innovation offer various support systems that include:

- export promotion packages;
- food and agribusiness growth centres;
- export market development grant;
- export finance and insurance corporation;
- market access for small exporters grant, rebate for exporters (registration);
- promoting Australian products overseas in Australia week and other events;
- Austrade service for agricultural and food exporters, and support for trader's participation in expos and trade fairs.

Challenges

Price is the primary driver of competitiveness when competing on the global apple market. Fresh apple is generally considered and treated as a commodity due to the small number of distinguishing physical features for consumers. Price is the function of production, supply chain, regulatory and marketing costs. The main disadvantage of Australia's trade competitiveness lies in its high cost of labour, Australia has the highest minimum wage rate compared to its major competing countries - USA, New Zealand, China and Chile (www.wageindicator.org). In apple production, labour costs constitute a significant portion of production and supply chain cost. As a result exporters need to focus on efficiency at various stages of the supply chain and be innovative, agile and adoptive of new technologies and market demands.

Figure 2. Minimum wage rate among Australia's apple trade competitors and partners¹ (source: Wikipedia; wageindicator.org (2018)).



Exchange rate fluctuation has always been a factor determining the competitiveness of export. Australia lost its apple export competitiveness primarily due to the appreciation of its currency in 2005/06 and in 2009/10. Exporters need to closely follow the trend and continuously look for alternative options.

¹Setting minimum wage rate is not mandatory in South Africa and is determined through collective bargaining agreement on sector by sector basis in Italy. Values for Germany and France can be taken as proxy for Italy.

1 Export Overview (cont.)

Recently, USA obtained access to the Indonesian market, which is likely to increase supplier competitiveness in this market. Two other primary destination markets (UK & PNG) for Australian apple exports are also the major export destinations for USA. However, USA, being in the northern hemisphere, only offers counter-seasonal competition to Australian exporters. The shrinking size of the domestic markets for local producers due to the import growth from New Zealand and China is also a challenge to Australian apple producers that drives export orientation.

Economies are ranked on their ease of doing business, where top ranked countries have business-friendly regulations. With the exception of the UK (ranked 7), major importing partners of Australia rank low in the ease-of doing business index. Therefore, new exporters will need to be prepared for potentially cumbersome business and regulatory processes in those countries. Cultural differences among partner countries can also present similar challenges, but can be managed with continuous exposure and experience in export destinations.

One of the biggest challenges being faced by Australian apple growers is to maintain the 'quality and safety' image, which includes setting up standards on biosecurity, production and food safety at high level. Complying with these standards requires concerted efforts industry wide.

1.4 Conclusion

Australia is currently a minor player in the global apple trade. Yet it needs a boost of export growth in apple trade to incentivise apple production domestically. Australia's competitive edge largely remains with premium products, niche markets and product differentiation that comes from strategic partnerships and co-innovation. An important source of competitiveness for Australian apple producers is increasing efficiency in production and supply chain. Any competitive edge based on efficiency will only give short term advantage. To enjoy the advantage sustainably over a long run, producers and value chain actors of the Australian apple industry need to create and add intangible and credence value to customers, which comes from provenance, traceability, food safety and direct linkages. With its level of export, Australia cannot compete solely on price, especially against China that enjoys combined advantages of economies of scale, rapid technological advancement, strong infrastructural base, and lower wages.

Export market is not a license to profit. Rather, it is an opportunity that needs to be converted into success through internal capability building, meeting compliance obligations, encouraging strategic partnerships and innovation and thorough market research and adaptation. Exporters need to look beyond the 'clean, green and safe image' and build other unique images such as 'experience Australia in apple'. To compensate for small share in export markets, growers and exporters can also benefit by agreeing on common standards and collective brands. Other strategic alternatives for export growth could include using marketing and promotional strategies that appeal to high end consumers, and marketing and positioning Australia within the export destination as a country that ensures it provides premium product. Strong presence of Asian and European backpackers in our apple production can be used to establish a human connection between Australian apples and destination markets.

2: Basics of Exporting

2.1 Fundamentals of exporting

Knowledge and understanding about exporting is vital to ensure your economic success. It is highly advisable to check with the Australian Government, Australian Trade and Investment Commission about exporting. Please check the website: <https://www.austrade.gov.au/Australian/Export/Guide-to-exporting>.

There are numerous transactions involved in the movement/transfer and sale of your produce and the purchase by overseas vendors. The substantial number of transactions, approvals and paperwork involved are shared amongst the actors involved in your supply/value chain. These are:

- domestic packers
- domestic transport companies
- inspectors
- buying and selling agents, wholesalers
- shippers/freight forwarders
- shipping or airline companies
- customs brokers
- Australian Customs Service
- Australian Tax Office
- Australian Quarantine Inspection Service
- Other Australian government agencies
- Australian banks and overseas banks

However the prime object is to ensure your economic viability by minimising costs and maximising sales revenue on your product to provide a financial benefit (increased profit above your domestic profit level). Selling internationally can help in reducing the risk of being exposed to local domestic market fluctuations in volume, price and business cycles. There are many Australian Government programs and export councils (Federal and State) to assist you in developing export markets with minimal risk.



Logical steps for export business development

Develop an export business plan

- Include market information (current sales and marketing strategy)
- Identify market opportunities (market research, product modification, target market analysis, Intellectual Property Protection (IP))
- Local resources needed for success
- Determining your potential and preparing for export by managing the commitment and resources needed. These include:
 1. Financial resources (international expenses and longer pay back times)
 - a. Production costs, distributions costs, sales and promotion costs
 - b. Payment arrangements and currencies to use
 - c. Insurance and credit checks
 2. Your product and services (match the right product to the right market)
 - a. Market research (see sections 3.1)
 - b. Marketing message and promotion (Australian produced clean and green image)
 - c. Market structure
 - d. Entry options (partner/distributor or local presence)
 - e. Market growth predictions (product lifecycle, competitors)
 - f. Labelling and traceability (company and product)
 - g. Logistics and distribution channels
 - h. Pricing strategies
 3. Communication resources
 4. Staff resources

In target market analysis (See section 3.2 in this manual)

- Visit your market (4 P's of market analysis) and ensure you are clear about import restrictions, regulations, tariffs, and competitors.

The process of exporting and market exploration and entry strategy

- Entry strategy and risk management strategies for suppliers, production, freight, pricing, promotion and intellectual property (IP), legal, financial and investment.
- Ensure you have all your documentation correct for freight and logistics
- Pricing, distributing and servicing your product in the foreign marketing and promotion and IP protection
- Packaging and labelling requirements (language, quantity, volume and size requirements)
- Financing your exports and ensuring you get paid – these factors need to be included your financial strategies
- Growing your overseas business and your management and investment strategies

2.2 Export Terminology

There are a range of issues that will affect your ability to trade overseas. There are different legal systems and laws if a dispute does arise: rules of competition, patent registration, overseas extra-territorial legislation and product liability. You should seek advice from your State or the Australian Chamber of Commerce and Australian Government Trade and Investment Commission.

It is essential you understand the terms used by your export documentation, exporter, shipper and transporter. Provided below are some of the terms used in international trade extracted from the International Business Handbook, Published by the International Business Services Department, Commerce Queensland (Queensland's Chamber of Commerce and Industry) and Australian Export Handbook 18th Edition ISSN 0312-3774. These terms are used for insurance and legal purposes.

Act of god: this is an inevitable event occurring without intervention of man. This may include: flood, tempest, or death and operate in certain contracts by insurers and carriers.

Ad Valorem: according to value, an ad valorem stamp on deeds or documents is one fixed in portion to the amount of rent or other element of value expressed in the deed.

Air Waybill: a document which is a receipt for cargo received by an airline and is evidence of a contract between the consignor and airline.

Back Freight: payment due to the shipper for the cartage of goods beyond the contract or owing to circumstances beyond the control of the shipowner.

Banker's Indemnity or Guarantee: this form may be required in certain circumstances:

5. By a shipowner to be completed by the consignee and countersigned by the consignee's bank, when release of goods is required without producing the bill of lading (e.g. if bill of lading is lost).
6. When a clean bill is needed for a Letter of Credit and the shipowner, for different reasons
7. By a chamber of commerce when issuing an "Admission Temporaire-Temporary Admission Carnet" for the goods to be temporarily exported from Australia.

Bill of Exchange: An order in writing from one person or firm to another requiring them to pay a certain sum to a person named.

Bill of Lading: A document which is a receipt for cargo received on board and is evidence of the contract between the shipper and shipowner. It is also evidence of title to the goods described on it.

Bonded Goods: Imported goods deposited in a Government warehouse until duty is paid.

Carnet: A temporary exportation/importation customs clearance document issued by the Chamber of Commerce.

Cash against Document or Documents against Payment (D/P)

Full shipping documents are sent to a bank or an agent at the port of destination with instructions that they are to be handed over to the consignee only in exchange for the monetary sum due.

Certificate of Origin (CO): A document to prove the place of growth, production of goods specific thereon.

Clean Bill of Lading: One in which there is nothing to quantify the admission that the goods are shipped in good order and condition.

2: Basics of Exporting (cont.)

Commercial Bill: A fixed short term (up to 180 days) finance facility at a fixed interest rate. An alternative to floating rate overdraft finance.

Commercial Invoice: A document which provides details of sale between buyer and seller.

Consignee: The firm or persons authorised to receive the cargo and to whom it is consigned.

Documents of Title: Documents produced by a consignee as evidence of right to take delivery of goods (e.g. Bill of Lading and export invoice).

Draft: Bank draft or Bill of Exchange. See Bill of Exchange.

Force Majeure: An occurrence outside human control (e.g. earth quake), a superior power.

Forward Exchange Contract: A contract between a bank and a customer under which the bank agrees to set the exchange rate now to purchase from the seller to customer at a fixed amount in a foreign currency at a future date.

Free On Board (FOB): Goods delivered on board the vessel free of exchange charge to the purchaser.

Freight Contingency: The insurable interest of a consignee who has paid freight on goods when delivered over the ship's side, but where the goods are still subject to peril until they arrive at the final destination.

House Air Waybill: A special waybill used for consolidated air freight shipments.

Incoterms: International rules for the interpretation of trade terms used in international trade, formulated by the International Chamber of Commerce.

Indemnity: Liability of an insurer for loss under policy.

Invoice: A document setting out in detail the goods consigned, marks and numbers, cost of any charges, and name of consignee.

Inward Charges: Pilotage and other expenses incurred on entering port.

Letter of Credit or Documentary Credit: A document authorising payment to the person named, subject to fulfilment of certain specific conditions on the part of the person authorised to receive the money (e.g. evidence that goods have been shipped). Also known as a Documentary Credit.

On Consignment: Goods shipped with payment made to the shipper as the goods are sold at destination. The shipper retains ownership.

Pro-forma Invoice: A specimen invoice – often requested by the buyer for the purpose of applying for an import licence or foreign-exchange allocation before contract sale is concluded.

Promissory Note: A note promising to pay a certain stated sum on a specified date.

Through Bill of Lading: Bill of Lading covering receipt of goods at the place of acceptance of the cargo for delivery to the ultimate destination, embracing transport by more than one means.

Wharfage: Charges made for the use of a wharf, usually levied on the cargo owner.

Incoterms Classification

There are now 11 Incoterms used in international trade and these rules apply to any mode or modes of transport and rules for seas and inland waterway transport. The following information is from the International Chamber of Commerce (ICC) website <https://iccwbo.org/publication/incoterms-rules-2010/>. The Incoterms are:

Rules for any mode or modes of transport

EXW	Ex Works
FCA	Free Carrier
CPT	Carriage Paid To
CIP	Carriage And Insurance Paid To
DAT	Delivered At Terminal
DAP	Delivered At Place
DDP	Delivered Duty Paid

Rules for sea and inland waterway transport

FAS	Free Alongside Ship
FOB	Free On Board
CFR	Cost And Freight
CIF	Cost Insurance And Freight



2.3 Export product pricing and cost considerations

When developing your pricing strategy you need to take into account many factors that are not commonly used for the domestic market. There are many factors to consider when setting up your pricing strategy as this is important in positioning your product and creating product awareness.

You may choose to use a uniform pricing policy across all overseas markets or use different pricing policies for individual markets to stimulate demand. It is suggested you consider the market demand for your product and how you wish to maximise your profit and obtain market entry and continued market demand for your product in both the short and long term.

Understand how to determine costs, including all domestic costs (minus domestic marketing costs) and export costs (administration, research and development, overheads, distributor costs, taxes, insurance) to determine your return. In addition bulk purchasing and increased buying to meet sales and increased labour efficiencies and high volumes of production can reduce your costs of production per unit (economies of scale). These factors are included in Table 2.

Develop a price map with assistance from you exporter in relation to competitor's pricing in your target market. This should include the value added differentiation perceived by consumers of your product, the price range, and target market segmentation description. A formal pricing list should be developed and include some of the following information.

- Define key terms used in international trade (Incoterms)
- Limiting agreement to the contract
- Describe the goods
 - Product name/s, range, description, reference code
 - Pack size range
 - Number of units per carton
 - Weight and dimensions of carton
 - Fees and charges
 - Price quote per unit (e.g. FOB, CIF etc.)
 - Who is responsible for what (your responsibility and the buyers responsibility)
 - Contents and payment clause
 - Terms of sale, payment terms, insurance coverage
 - Force Majeure
 - Resolution of dispute
 - The laws applicable to overseas country and jurisdiction
 - Warranties and exclusions
 - Date of price list issued.

Table 2. Guide to Establishing Your Cost Factors (Include these in determining your export price).

Calculations	Cost Factor Descriptor	Dollar value (A\$)
+	Raw material costs (including production costs)	
+	Export packaging costs	
+	Overheads	
+	Variable costs	
=	Total production costs	
-	Export duty concessions etc. (you may wish to consider a reduction in the export price if your fixed overhead costs are covered completely by domestic sales (your marginal costing factor)	
=	Net production cost	
+	Financing costs (Interest factors(Days @% p.a.)	
+	Sales and marketing costs (Sales margin.....%) – (always include your agent's commission, finance costs and profit margin)	
=	Ex works production selling price (EXW WORKS) to a named place	
-	Transport/cartage costs (to freight forwarder depo - wharf or airport)	
-	Clearance costs (inspection certificates –customs clearance (EDN), AQIS, certificate of origin, clearance documents etc.)	
=	Selling price for Free Alongside Ship (FAS) to a named place Or	
=	Selling Price for Free Carrier (FCA) to a named place	
+	Australian port terminal charges, port services, loading charges (wharf or airport or storage costs)	
=	Selling Price for Free On Board (FOB) to a named place	
+	Freight costs (Sea and airfreight - for air freight always add the air waybill and airport charges.	
+	Currency adjustments costs	
+	Bank surcharges and bank surcharges if applicable	
+	Basic service rate additional costsmay include an additional 5% above the added cost to cover any unforeseen contingencies)	
=	Selling Price for Cost and Freight (CFR) to a named place Or	
=	Selling Price for Carriage Paid To (CPT) a named place Or	
=	Cost and Freight (CFR) to a named place	
+	Insurance costs (marine insurance etc.)	
=	Selling Price for Cost and Insurance and Freight (CIF) Or	
=	Selling Price for Carriage and Insurance Paid To (CIP) to a named place	

2.4 Understanding strategies to use for exporting

As indicated in Section 1.3. Opportunities and challenges for apple export growth in Australia's domestic markets are highly sensitive to production levels. Exporting is an opportunity for growers to build internal capacity whilst meeting compliance obligations, look at strategic partnerships, undertake market research and adapt as required to meet export market requirements.

There are several strategies you can use to enter an overseas market. These are:

- Direct export
- Indirect export
- Intra-corporate transfers

Direct strategies:

By selling direct to end users in a foreign market, you eliminate the middlemen, vertically integrating your supply chain. This makes it easier to customise your market entry strategy and your product to suit market conditions encountered in accessing the foreign market. Your products are made directly available to your customers. The sales are between you and your customers/consumers. In addition, you may wish your product(s) sold through local sales representatives who promote your products, but they do not taking ownership of your product. You may also use a distributor to sell your products directly to buyers.

By selling directly to your customers, you have the responsibility for:

- After-sales servicing of your product
- Sales - orders and billing
- Conducting your own market research
- Marketing your product
- Distributing your product
- Warehousing and delivery of your product to the foreign market

This strategy comes at a far greater cost. You have to set up your own networks, sales representatives and promote your product.

Indirect strategies:

In using an indirect strategy you sell your products or product(s) indirectly to end users overseas. Your exports are not handled directly by you (the producer), but your product(s) is handled through intermediaries such as agents or export management and trading companies. You rely on export management companies to provide support and this usually involves distribution of the product(s), warehousing, shipping billing and insurance.

The advantages of indirect strategies are:

- Your exporting process is simplified.
- The export companies provide in country:
 - Organisation of shipping
 - export documentation
 - market information
 - sales representatives
 - promotional strategies and information

However, indirect strategies come at a cost (monetary value) and control of your IP and trademarks etc.

Intra-corporate transfers:

With global value chains and corporate farming systems increasing in Australia and the industrialisation of farming practices, distribution and the marketing of products, the farm's products can be transferred overseas for sale in another country.

In the past, intra-corporate transfers were staff based. Staff were transferred to fill a position in another country within the company or placed into a position in another company to facilitate the sale of the company's product. Closed loop marketing systems, club cultivars and marketing programs by various international companies may result in your product(s) being marketed overseas.



2.5 Financing your foreign business practices

All international transactions are managed according to the terms and conditions you negotiate with your buyer. The terms you negotiate should include minimisation of risk, protection of your company from trade disputes, legal actions and claims by other parties (your customers and their consumers). There are no international or national standards that regulate trade contracts. Contracts can be simple or complex (one page or many pages), but most contracts depend upon the type of goods you are selling and relationships developed with the purchasers. In addition, each country has different requirements that must be in a contract for it to be legal and binding. You should provide your buyer with adequate details in your trade contract. These may cover:

- **Date of contract**
- **Seller's and buyer's names**
- **Product name**
- **Product description**
- **Packing**
- **Quantity**
- **Unit price**
- **Terms of delivery (Incoterms)**
- **Terms of payment**
- **Delivery date**
- **Validity**

All parties directly involved in the contract, middlemen agent, and any other third party should sign the contract with you and the buyer. If issuing a quotation you should include *"This quotation is valid for a period of XX days from the above date"* (Validity).

In addition, errors may occur, and you should include the acronym E.&O.E ("Errors and Omissions Expected"), Claims clause, Arbitration Clause, Force Majeure Clause. Units of Measure, Currency, Interpretation or Translation.

The financial risks to your company from a contract can include:

- **Taxation and revenue laws in Australia (tax rate on goods and GST) as well as those overseas countries you are exporting to.**
- **Exchange rate and currency fluctuations for the period of the contract and or the time period until acceptance by your customer.**
- **No Payment Risk (always use a payment method that is secure).**

2.6 Letters of Credit (L/C) to use in your export venture

Letters of Credit (L/C) are regulated by International Chamber of Commerce under the Uniform Customs and Practice for Documentary Credits (UCP 500). L/C, always draw the draft on the bank, not on the buyer.

Types of Letter of Credit

- Revocable and Irrevocable L/C

A revocable L/C may be amended or cancelled by the Issuing Bank at any moment and without prior notice to the Beneficiary. Never accept this form of L/C in your export arrangements.

- Confirmed L/C

Exporting to a country with economic or political instability
L/C should be confirmed by a first-class bank

- Transferable L/C

Allows dealing with more than one beneficiary.

- L/C payable at sight

“Payable at sight” means that you’ll be paid “immediately” (in fact, it may take up to 7 days) after presentation of the documents stipulated in the L/C to the Issuing Bank or to the Confirming Bank if it was confirmed.

- L/C payable on the maturity date

You’ll be paid on the maturity date indicated in the L/C after presentation of the documents stipulated in the L/C to the Issuing Bank.

2.7 Best practice principles when exporting

It is suggested that you use best practice principles is setting up your exporting venture. These include:

1. Develop a risk management plan and matrix – this should be part of your business export plan)
2. Set up your funding options – factor in your cash flow, venture capital, Australian Government assistance schemes and grants, Export Finance Insurance, and your accountant
3. Pre-payment – the highest option
4. Letter of Credit
5. Credit Insurance
6. Know you customer credit history
7. Invoke non-payment precautions
8. Official representation
9. Use a trusted intermediary – bank or agent
10. Seek advice – Australian banks office advice on different payment methods, accountants, etc.
11. It is best not to offer credit or credit items to customers
12. Have a legal option

3: Making Your Business Ready for Export

3.1 The Australian apple export process: a step-by-step guide

This step-by-step guide has been prepared to help you ensure your business and your fruit meets export requirements. This guide has been adapted from a similar guide published by the Plant Export Operations Branch within the Department of Agriculture and Water Resources. Each step forms the basis of subsequent chapters of this guide.

Step 1 – Identify target markets

Understanding target foreign markets is a critical success factor for exporters. Export market analysis helps agribusinesses understand foreign market requirements so as to reduce uncertainties and make informed choices about market opportunities. This involves understanding the features and behaviour of target markets, as well as trends in consumer preferences.

Step 2 – Identify importing country requirements

It is your responsibility as an exporter to check the importing country's requirements before you export. Ask the importing country's National Plant Protection Organisation or your importer whether your commodity is permitted and whether any special conditions must be met. The Department of Agriculture and Water Resources (DAWR) may be able to help if you are having difficulty.

You can search the department's plants database for information on importing country requirements for plants and plant products. Import conditions vary depending on the country, commodity and the end use of a product. For example, seeds intended for sowing may have different import conditions and risks than seeds intended for consumption. Your goods will be inspected based on the importing country conditions and Australian export legislation. See Step 5 for information on inspections.

If your exports do not meet the importing country's requirements, they may not be allowed into the country. As a result your goods may be destroyed or you may have to pay for their return to Australia. Breaches of this kind may damage your business relationships and affect future export opportunities.

Step 3 – Register your business for export

Register your orchard block(s)

To be registered, your orchard(s) and packhouse premises must be constructed, equipped and operated in an effective and hygienic manner. To register, first submit an Export Registration form to your local DAWR office. Once the application is approved and your establishment has passed inspection, your premises will be registered and you will receive a certificate of registration. Registration timelines are outlined in the Plant Export Operations service charter.

If your premises are not registered, you can use a registered establishment or apply to have your premises registered. Ask your peak industry body to help you find a registered establishment.

To receive an export permit, first provide DAWR with a completed *Notice of Intention to Export Prescribed Goods or a Request for Permit* and supporting documents.

Step 4 – Prepare Your Fruit for Export

Fruit exporters are required to comply with a variety of regulations before they are permitted to send fruit to overseas markets. Common requirements are grouped into six primary areas:

- Practices relating to quarantine pest monitoring and orchard hygiene
- Regulations relating to agrichemical use and residue monitoring
- Importer requirements about cultivar selection, harvest maturity and storage
- Export packaging and labelling requirements,
- Government inspection and end-point phytosanitary treatments,
- Transport and shipping regulations

Step 5 – Export Authorisation

Apples are a prescribed good under Australia's *Export Control Act 1982*. Being classified as a prescribed good means that all consignments of apples over 10 kg require inspection and export certification by Authorised Officers before they can be exported.

This is to protect the reputation of Australian plants and plant products by monitoring compliance with Australian legislation and by helping operators comply with international regulatory requirements. Once you are ready to export your goods, contact *Plant Export Operations* to have your certificates authorised.

3.2 Exporter responsibility summary

As an exporter you must meet all exporter requirements outlined in the *Export Control Act 1982* and other subordinate legislation. In addition, you must ensure:

1. the orchard(s) used to grow fruit for export is registered as export-approved by DAWR for your selected destination country(s); **and**
2. all fruit grown for export are grown and packaged in compliance with all importing requirements of the destination country; **and**
3. the packhouse facilities are maintained in a hygienic manner and registered as export-approved by DAWR for your selected destination country; **and**
4. all consignments headed for export to protocol markets are inspected by an Authorised Officer and that all containers and other transport unit(s) used in export consignment meet the requirements of the Export Control (Plants and Plant Products) Order 2011; **and**
5. the consignment includes all the necessary export documents for that market. These documents may include but are not limited to export certificate, phytosanitary certificates, and any other documents required by the destination country.

4: Identifying Target Markets

4.1 Export market analysis

Export market opportunities are expanding for Australian premium apple producers and exporters due to a favourable foreign exchange rate, a rise in income level in Australia's major export destinations in Asia and a "clean, green, safe and quality" image of Australian agricultural and food products in overseas markets.

Australia's share of apple exports compared to Australia's national apple production and global apple trade is very small. In 2016/17, Australia exported 4,950 tonnes of apples worth \$12.75 million (Fresh Intelligence Analysis for FGT 2018), and in 2015/16, 4,665 tonnes of apple were exported, a mere 1.5% of total national production of 316,758 tonnes (Hort Innovation 2017).

4.2 Export market research process

Despite offering an attractive alternative to domestic markets, foreign markets present a challenging business environment for exporters due to greater uncertainties in an unfamiliar market environment. Understanding target foreign markets is a critical success factor for exporters. Export market analysis is a systematic examination of data and information about people, product, place, and policy (the 4 P's) related to an export business. Export market analysis helps agribusinesses understand foreign market requirements in order to reduce uncertainties and make informed choices about market opportunities. It involves primary market research on features and behaviour of target markets (including space and time dimensions where consumers, customers, collaborators and competitors interact) as well as secondary review of information about the product (production, consumption and trade) and related policies. Market research involves in-depth understanding of various elements of the 4 P's, which are outlined below.

4 P's of export market analysis: elements

People – features and behaviour of consumers, customers, collaborators and competitors

Product – attributes (including price), standards, diversity, and demand and supply situation of a product

Place – distribution and value addition points, distance between production regions and markets, security situation and business environment of the market

Policy – regulatory policies related to the product and its transactions (including finance)

In general, an export market is a real or virtual place in a foreign country where at least two sets of people (customer and supplier) engage in the exchange of a good, service and finance that are regulated by the policies of importing and exporting countries. Export market analysis therefore involves analysis of macro and micro aspects of these 4 P's. It starts with an in-depth understanding of macro factors and indicators at country level. Understanding these macro factors helps to identify potential target markets at a micro level and develop in-depth strategies for those specific target markets. Target market analysis remains highly context specific and requires primary research with time and space considerations.

Steps in export marketing research

1. Market pre-entry research: This step involves assessment of country level broad socio-economic factors that influence international trade and competitiveness. These include product-specific production, consumption and trade status as well as national socio-economic indicators such as population and economic growth, gross domestic/national production, inflation, consumer price index, foreign exchange rate, ease of doing business etc. Later sections in this chapter and its appendix primarily focus on presenting the information relevant to this step, particularly about Australia's traditional export partners and competitors.

Other product-specific trade related factors such as market access and phytosanitary requirements, intellectual property rights, trade policies, regulations and barriers, domestic investment, government support and protection as well as security situations are also assessed in this step. Some of these factors can be sensitive and subtle. The level of breadth and depth of assessment of these factors is determined by the objectives of the market research (such as entry or expansion) as well as the availability of time and resources. Based on the information, potential markets for export are identified and selected for further analysis.

2. Target market research: Once the target market is determined, an in-depth analysis of each market is required before making decisions. Such analysis involves assessment of the size, share and segments of a particular market, distance and cost associated with the market, export logistics, importing partners and their capacities, competitive rivalry in target markets, level of market integration, supply chain costs, ease of entry and exit, power dynamics, availability of substitutes etc.

3. Consumer Research: This step involves assessment of consumers' willingness to pay, taste and preferences about the product, product diversity, quality parameters and standards, drivers of premium price, consumer segmentation etc.



Figure 3. Key steps in export market research.

4: Identifying Target Markets (cont.)

4.3 Australian apple imports

Australia is a net exporter of apple. However, it also imports apples from China and New Zealand, allowing access since 2011. In 2016, the combined imports of apples to Australia were worth \$2.4 million (Table 3) or 1,053 tonnes (Table 4), which is less than 0.5% of the comparable volume of Australia's domestic supply. This was the first year that apple imports exceeded 1,000 tonnes a year. Since both China and New Zealand are large apple exporters, Australia accounts for a very small share of their global export volumes.

Table 3. Value of Australian apple exports between 2010 and 2017 (\$ 000's).

Value	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share	5 year CAGR
Total Imports	1,225	580	832	1,039	2,095	1,642	2,443	19%	30.9%
China	1,225	551	681	786	1,239	916	1,468	12%	21.2%
New Zealand	-	29	151	253	856	725	975	8%	59.4%

Source: ABS (2017) via GTA; ITC Trademap; Fresh Intelligence analysis (2018) for FGT.

Table 4. Volume of Australian apple imports between 2010 and 2017 (tonnes).

Volume	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share	5 year CAGR
Total Imports	703	324	436	391	751	619	1,053	21%	24.7%
China	703	310	378	325	474	357	698	14%	16.5%
New Zealand	-	14	57	66	277	262	355	7%	57.8%

Source: ABS (2017) via GTA; ITC Trademap; Fresh Intelligence analysis (2018) for FGT.



4.4 Australian apple exports

State-wise distribution of export volume and value (2009/10-2016/17)

In 2016/17, Australia exported 4,950 tonnes of apple. Victoria was the largest apple exporting state with 41% of the national volume. Queensland exported 27%, mostly to Papua New Guinea (PNG) and Indonesia. South Australia, with 20% share, increased volumes of Pink Lady® to the UK. Tasmania accounted for 9% of the volume or 442 tonnes. While the growth of Australian apple exports has been relatively small yet positive (0.8%) for the last 8 years, Tasmania and Western Australia's share in the export has declined by 21% and 48% respectively. Table 5 and Table 6 summarise the Australian apple export trend since 2009/10 by volume and value respectively. Measured by export volume, South Australia and Victoria experienced an encouraging growth (compounded annually) of 102% and 15% respectively. During the period, the growth trend was negative for Tasmania (-21.1%) and Western Australia (-47.9%). Altogether, Australia's apple export remains nearly at par to the level of 2009/10 (Table 5).

Table 5. Volume of Australian apple export volume by states between 2010 and 2017 (tonnes).

Volume	09/10	10/11	10/11	12/13	13/14	14/15	15/16	16/17	16/17 share	09-17 (CAGR)
Total Australian Export	4,675	2,509	2,873	3,907	2,121	2,134	4,665	4,950	100%	0.80%
Tasmania	2,327	247	313	207	85	245	365	442	9%	-21.10%
Victoria	757	393	494	1,515	386	474	1,755	2,008	41%	15.00%
Queensland	1,142	1,219	1,363	1,539	1,137	1,100	1,271	1,351	27%	2.40%
South Australia	7	59	1	353	272	229	823	977	20%	102.00%
New South Wales	90	261	413	179	50	29	187	105	2%	2.30%
Western Australia	352	329	252	94	173	30	176	4	0%	-47.90%
Northern Territory	-	-	-	9	-	-	8	2	0%	
Re-Exports	0	0	36	12	19	28	80	60	1%	

Source: ABS (2017) via GTA; Fresh Intelligence analysis (2018) for FGT.

Measured by value, however, Australian apple exports increased by 7% (compounded annually) for the same duration. Similar to the growth by volume, total value of exports was positive for South Australia (133%), Victoria (21%) and New South Wales (11%), Tasmania and Western Australia recorded negative growth of 15% and 49% respectively during the period (Table 6).

Table 6. Value of Australian apple export volume by states between 2010 and 2017 (\$ 000's).

Volume	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share	09-17 (CAGR)
Total Australian Export	7,883	6,019	5,979	7,236	4,542	5,898	12,367	12,750	100%	7.1%
Tasmania	3,178	344	405	279	260	846	1,533	1,029	8%	-14.9%
Victoria	1,162	794	754	2,706	706	968	3,950	4,322	34%	20.6%
Queensland	2,379	2,998	3,432	2,876	2,128	3,009	3,303	4,179	33%	8.4%
South Australia	7	225	3	695	849	846	2,086	2,611	20%	132.9%
New South Wales	178	847	807	365	100	81	376	361	3%	10.6%
Western Australia	979	811	544	270	459	90	732	9	0%	-49.2%
Northern Territory	-	-	-	23	-	-	23	13	0%	
Re-Exports	0	0	34	21	40	58	364	226	2%	

Source: ABS (2017) via GTA; Fresh Intelligence analysis (2018) for FGT.

² Reporting period is from July to June

4: Identifying Target Markets (cont.)

Australia consistently ranks at the top in terms of per unit value of exported apple (Table 7). This suggests that Australian apples are popular among overseas consumers and/or marketed at high-end markets. During the period from 2009/10 to 2016/17, export price (FOB) of Australian apple increased from \$1.69 to \$2.33 per kg. Among the Australian states, Victoria (\$2.15 per kg), Western Australia (\$2.32 per kg) and Tasmania (\$2.33 per kg) received the lowest value of their produce compared to Queensland (\$3.09 per kg), New South Wales (\$3.42 per kg) and Northern Territory (\$5.34 per kg) (Table 8).

² Reporting period is from July to June.

Table 7. Value of apple export by Australia and competitors (USD per kg).

Volume	Jan - Dec 2012	Jan - Dec 2013	Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016
Australia	1.94	1.72	2.07	1.98	1.72
China	0.98	1.04	1.19	1.24	1.10
United States	1.24	1.26	1.22	1.04	1.20
Italy	1.00	1.19	1.00	0.84	0.87
Chile	0.96	1.01	1.00	0.94	0.87
New Zealand	0.95	1.16	1.26	1.21	1.30
South Africa	0.57	0.92	0.93	0.84	0.70

Source of data: ABS (2017) via GTA; ITC Trademap; Fresh Intelligence analysis (2018) for FGT.

Table 8. Average value of Australian apple by unit value (\$ per kg) (FOB).

Volume	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17
Total Australian Export	1.69	2.40	2.08	1.85	2.14	2.76	2.65	2.58
Tasmania	1.37	1.39	1.29	1.34	3.06	3.45	4.20	2.33
Victoria	1.53	2.02	1.53	1.79	1.83	2.04	2.25	2.15
Queensland	2.08	2.46	2.52	1.87	1.87	2.73	2.60	3.09
South Australia	0.98	3.81	3.98	1.97	3.12	3.70	2.53	2.67
New South Wales	1.98	3.25	1.95	2.04	2.01	2.84	2.01	3.42
Western Australia	2.78	2.46	2.15	2.87	2.65	3.01	4.17	2.32
Northern Territory				2.75			2.76	5.34
Re-Exports	2.56	2.56	0.97	1.76	2.17	2.09	4.57	3.80

Source: ABS (2017) via GTA; Fresh Intelligence analysis (2018) for FGT.

Australian apple destinations

In 2016/17, the UK was the leading market destination accounting for 25% of the total export volume, or 1,222 tonnes worth \$3.4 million. Papua New Guinea, Indonesia, Malaysia and Hong Kong were other leading destination markets. Figure 4 presents Australia's major apple export destinations and their share in total export.

Australia's export destinations can be categorised as protocol, unregulated and other markets. Indonesia, Thailand, China, Japan, India, Taiwan, Vietnam, Philippines and South Korea are regulated protocol markets that have specific phytosanitary and market access requirements in place to export apples from Australia. Exporters aiming at these markets need their apple orchard, packhouse, cold storage and treatment facilities registered to meet the protocol requirements. These requirements, however, vary among importing nations. In 2016/17, protocol countries accounted for 20% of apple export by volume from Australia. The protocol markets were 23% by value, led by Indonesia, which has had some import restrictions since 2012. Thailand and Vietnam changed to protocol markets in 2013 and 2015 respectively, resulting in some lost trade in the changeover. Trade has not been regained to Vietnam.

Hong Kong, Singapore, and Malaysia are unregulated (non-protocol) markets. These countries are net importers of fresh apple, have high purchasing power and preferences to premium agricultural products, and constitute strategic export markets for Australian producers. The unregulated markets, without tariffs or protocols, accounted for 13% by value and 18% by volume of apple exports in 2016/17.

The UK, PNG, UAE, Netherlands, New Caledonia, Fiji, Qatar, Saudi Arabia, Brunei Darussalam, and other Pacific Island nations are other non-protocol markets that still require phytosanitary certificates. Their share of Australian apple export market was 62% by volume and 64% by value. The UK and PNG are main contributors in this category.

Major apple export destination and their share by volume
(2016/17)

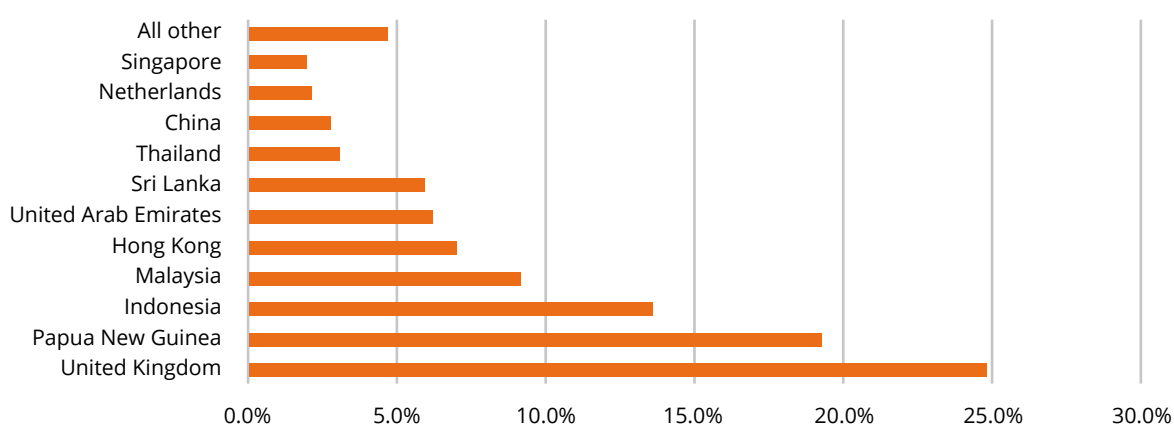


Figure 4. Australia's major export destinations and share.

4: Identifying Target Markets (cont.)

Distribution of Volume

In 2016/17, the top five markets for Australian apples by total volume of export (Table 9) were:

1. United Kingdom (1,222 tonnes, 27% share)
2. Papua New Guinea (949 tonnes, 19% share)
3. Indonesia (671 tonnes, 17% share)
4. Malaysia (453 tonnes, 9% share)
5. Hong Kong (343 tonnes, 7% share)

Table 9. Destination markets of Australian apple export by volume of export. Source: ABS (2017) via GTA; Fresh Intelligence analysis (2018) for FGT.

Protocol Market Export Volume (Tonnes)	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share	8 year CAGR
China	-	-	-	-	24	151	92	138	3%	
India	1,145	-	103	144	-	-	62	19	0%	-44.2%
Indonesia	570	767	606	350	-	230	434	671	14%	2.4%
Japan	134	-	-	-	-	-	-	21	0%	-23.2%
Philippines	-	-	-	-	-	-	2	-	0%	
South Korea	-	-	-	-	-	-	-	-	0%	
Taiwan	496	29	104	-	-	2	41	1	0%	-57.6%
Thailand	139	130	418	674	19	131	683	150	3%	1.1%
Vietnam	51	83	22	56	3	11	-	-	0%	-100.0%
Total Protocol (tonnes)	2,535	1,009	1,254	1,224	45	525	1,315	1,001	20%	-12.40%
<i>Protocol share of exports</i>	54%	40%	44%	31%	2%	25%	28%	20%		
Unregulated Market Export Volume (Tonnes)	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share	8 year CAGR
Brunei Darussalam	30	29	25	15	15	8	6	3	0%	-28.0%
Fiji	151	27	1	7	5	2	25	6	0%	-36.8%
Hong Kong	4	1	45	48	34	46	297	343	7%	89.7%
Kiribati	18	16	15	14	8	11	11	12	0%	-5.6%
Malaysia	338	27	246	337	128	77	411	453	9%	4.3%
Nauru	7	5	17	42	151	59	52	38	1%	26.7%
Netherlands	-	-	-	-	-	-	-	105	2%	
New Caledonia	51	29	23	77	59	35	29	13	0%	-18.0%
Papua New Guinea	759	770	878	1,523	1,148	942	1,067	949	19%	3.2%
Qatar	2	2	2	4	3	5	8	55	1%	59.1%
Singapore	103	17	57	62	33	158	272	97	2%	-0.9%
Sri Lanka	271	180	22	11	-	-	45	293	6%	1.1%
United Arab Emirates	1	-	21	19	6	9	331	303	6%	116.8%
United Kingdom	262	373	238	480	440	234	699	1,222	25%	24.6%
All other	142	24	29	45	46	23	95	57	1%	-12.2%
Total Unregulated	2,139	1,500	1,619	2,684	2,076	1,609	3,348	3,949		
<i>Unregulated market share of exports</i>	46%	60%	56%	69%	98%	75%	72%	80%		
Total apple exports	4,675	2,509	2,873	3,907	2,121	2,134	4,665	4,950	100%	0.8%

Distribution by total value of export

In 2016/17, the top five markets for Australian apples by total value of export (Table 10) were:

1. United Kingdom (27% share)
2. Papua New Guinea (19% share)
3. Indonesia (14% share)
4. United Arab Emirates (8% share)
5. Hong Kong (7% share)

Table 10. Destination markets of Australian apple export by total value of export. Source: ABS (2017) via GTA; Fresh Intelligence analysis (2018) for FGT.

Protocol Market Export Volume (Tonnes)	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share (%)	8 year CAGR (% trend)
China	-	-	-	-	71	471	250	291	2%	
India	1,348	-	115	122	-	-	83	41	0%	-39.3%
Indonesia	1,537	2,339	2,101	1,041	-	940	1,647	2,154	17%	4.9%
Japan	341	-	-	-	-	-	-	65	1%	-21.1%
Philippines	-	-	-	-	-	-	8	-	0%	
South Korea	-	-	-	-	-	-	-	-	0%	
Taiwan	834	48	138	-	-	50	664	3	0%	-55.1%
Thailand	220	395	804	1,334	35	348	1,527	381	3%	8.2%
Vietnam	192	258	73	139	16	28	-	-	0%	-100.0%
Total Protocol	4,472	3,040	3,230	2,636	121	1,836	4,178	2,936	23%	-5.80%
<i>Protocol share of national</i>	57%	51%	54%	36%	3%	31%	34%	23%		
Unregulated Market Value (\$ 000's)	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share (%)	8 year CAGR (% trend)
Brunei Darussalam	67	26	31	20	24	11	10	5	0%	-31.0%
Fiji	200	39	2	9	9	4	40	10	0%	-35.2%
Hong Kong	17	5	63	134	97	158	883	876	7%	75.7%
Kiribati	34	32	27	23	14	28	20	24	0%	-4.7%
Malaysia	358	40	297	466	263	244	606	546	4%	6.2%
Nauru	9	8	29	93	315	172	147	132	1%	47.4%
Netherlands	-	-	-	-	-	-	-	338	3%	
New Caledonia	88	55	55	112	100	67	37	19	0%	-19.4%
Papua New Guinea	1,102	1,400	1,533	2,354	2,130	2,132	2,028	2,454	19%	12.1%
Qatar	6	6	5	15	10	19	35	213	2%	66.3%
Singapore	104	38	51	90	116	339	424	207	2%	10.3%
Sri Lanka	326	180	24	8	-	-	52	396	3%	2.8%
United Arab Emirates	3	-	24	25	19	22	1,330	1,029	8%	132.5%
United Kingdom	905	1,071	523	1,156	1,249	815	2,464	3,411	27%	20.9%
all other	192	80	85	96	76	52	115	154	1%	-3.1%
Total Unregulated	3,411	2,979	2,749	4,599	4,421	4,062	8,189	9,814	77%	281%
<i>Unregulated share of national</i>	43%	49%	46%	64%	97%	69%	66%	77%		
Total apple exports	7,883	6,019	5,979	7,236	4,542	5,898	12,367	12,750	100%	7.10%

4: Identifying Target Markets (cont.)

Distribution by total value of export

By per unit value, the top five high value importing countries (2016/17) for Australian apple (Table 11) were:

1. Qatar (\$3.90 per kg)
2. Nauru (\$3.49 per kg)
3. United Arab Emirates (\$3.39 per kg)
4. Indonesia (\$3.21 per kg)
5. Japan (\$3.08 per kg)

As expected the protocol markets generated higher returns though were also relatively more difficult to trade with.

Table 11. Unit value of Australian apple exports in different markets between 2009 and 2017 (\$ per kg).

Protocol Market Price per Unit (\$ / kg)	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17
China	-	-	-	-	2.95	3.11	2.71	2.1
India	1.18	-	-	0.85	-	-	1.33	2.13
Indonesia	2.7	3.05	3.05	2.98	-	4.09	3.8	3.21
Japan	2.55	-	-	-	-	-	-	3.08
Philippines	-	-	-	-	-	-	4.2	-
South Korea	-	-	-	-	-	-	-	-
Taiwan	1.68	1.65	1.65	-	-	19.85	16.13	2.5
Thailand	1.58	3.03	3.03	1.98	1.89	2.66	2.23	2.54
Vietnam	3.74	3.12	3.12	2.49	5.56	2.52	-	-
Average Protocol	1.76	3.01	3.01	2.15	2.68	3.49	3.18	2.93
Unregulated Market Price per Unit (\$ / kg)	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17
Brunei Darussalam	2.27	0.88	1.24	1.32	1.57	1.37	1.55	1.68
Fiji	1.32	1.43	1.38	1.35	2.03	2.95	1.57	1.56
Hong Kong	4.38	4.39	1.4	2.8	2.9	3.44	2.98	2.56
Kiribati	1.83	1.97	1.76	1.58	1.67	2.46	1.74	1.96
Malaysia	1.06	1.45	1.21	1.38	2.06	3.18	1.47	1.21
Nauru	1.21	1.68	1.65	2.23	2.08	2.93	2.82	3.49
Netherlands	-	-	-	-	-	-	-	3.22
New Caledonia	1.71	1.9	2.38	1.45	1.71	1.88	1.24	1.5
Papua New Guinea	1.45	1.82	1.75	1.55	1.86	2.26	1.9	2.59
Qatar	2.86	3.35	3.44	3.43	2.96	3.77	4.27	3.9
Singapore	1	2.22	0.89	1.44	3.54	2.14	1.56	2.13
Sri Lanka	1.2	1	1.1	0.7			1.15	1.35
United Arab Emirates	2.07		1.15	1.34	3.1	2.33	4.02	3.39
United Kingdom	3.46	2.87	2.2	2.41	2.84	3.49	3.52	2.79
All other	1.35	3.41	2.93	2.12	1.64	2.24	1.2	2.69
Average Unregulated	1.94	2.18	1.75	1.79	2.30	2.65	2.21	2.40
Average Export Price / Unit	1.69	2.4	2.08	1.85	2.14	2.76	2.65	2.58

Source: ABS (2017) via GTA; Fresh Intelligence analysis (2018) for FGT.

Tasmanian Apple Export – Special Status

Tasmania as an island state has special status in apple export because of its fruit fly-free status. This provides a significant export advantage over the rest of Australia's apple production zones, particularly in export to China, Japan, Taiwan or Thailand. In 2016/17, Australian apple exports to China, Japan and Taiwan were solely met by Tasmanian apple. Tasmanian exports also accounted for more than a quarter of total Australian export to Hong Kong and United Arab Emirates during this period. In 2016/17, Tasmania exported 442 tonnes of apples worth \$1.03 million (Table 12, Table 13). This accounts for 9% share in total export. China was Tasmania's leading destination with 138 tonnes or 31% share, followed by Hong Kong and UAE. There were 21 tonnes exported to Japan where Tasmania is the only Australian state with access.

Tasmania picked up some Thailand volume based on its PFA status in 2015/16 but completely lost to competing countries in 2016/17. Vietnam is still waiting for negotiations and remains closed. Tasmanian exports to Hong Kong have increased since the improved access to China. Tasmania was a key supplier to India until the market was lost for China and Chile. India now imports around 250,000 tonnes though with no volume from Australia. Tasmania's apple export to UAE shows promising signs of export growth. Share of protocol, unregulated and other markets on Tasmania's apple export in 2016/17 were:

1. Unregulated markets: (166.5 tonnes -38% share)
2. Protocol markets: (160.9 tonnes- 36% share)
3. Other markets: (114.9 tonnes – 26% share)

In 2016/17, Australian sales of apples to China, Japan and Taiwan were solely met by Tasmanian apple exports. Tasmanian exports also accounted for more than a quarter of total Australian export to Hong Kong and UAE during this period.



4: Identifying Target Markets (cont.)

Table 12. Destination markets of Tasmanian apple export by volume (tonnes) between 2009 and 2017.

Protocol Market Volume (Tonnes)	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share
China	-	-	-	-	-	151.4	92.2	138.5	31%
India	1,144.60	-	-	144.1	144.1	-	41.2	-	0%
Indonesia	-	-	-	-	-	-	-	-	0%
Japan	133.8	-	-	-	-	-	-	21.2	5%
Philippines	-	-	-	-	-	-	-	-	0%
South Korea	-	-	-	-	-	-	-	-	0%
Taiwan	496.1	29.2	29.2	-	-	2.5	41.2	1.2	0%
Thailand	-	0.1	0.1	-	-	19.6	68.3	-	0%
Vietnam	1.7	33.7	33.7	31.5	31.5	9.5	-	-	0%
Total Protocol (tonnes)	1,776.30	63.1	63.1	175.6	175.6	182.9	242.8	160.9	36%
<i>Protocol share of Tasmania export</i>	76%	26%	26%	85%	85%	75%	66%	36%	
Unregulated Market Price per Unit (\$ / kg)	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share
Brunei Darussalam	-	-	-	-	-	-	-	-	0%
Fiji	16.3	-	-	-	-	-	4	-	0%
Hong Kong	0.2	-	-	16.2	32.2	42	88.2	127.9	29%
Kiribati	1.5	-	2.6	5.6	-	3.6	0.2	-	0%
Malaysia	74.3	-	20.6	0.1	-	-	-	38.7	9%
Nauru	2.8	-	4.2	7.9	-	3.2	-	-	0%
Netherlands	-	-	-	-	-	-	-	-	0%
New Caledonia	9.4	5.3	-	-	-	0.5	-	-	0%
Papua New Guinea	83.7	18	29.7	1.7	6.8	-	0.4	11.1	3%
Qatar	-	1.2	-	-	-	-	-	-	0%
Singapore	72.2	-	-	-	21.9	12.6	-	0	0%
Sri Lanka	223.9	159.5	22.1	-	-	-	21.2	-	0%
United Arab Emirates	-	-	-	-	-	-	8.6	103.7	23%
United Kingdom	-	-	-	-	-	-	-	-	
All other	66	0.3	0.4	0.2	-	0.1	-	-	0%
Total Unregulated (tonnes)	550.3	184.3	79.6	31.7	60.9	62	122.6	281.4	
Unregulated share of Tasmanian export	24%	75%	25%	15%	72%	25%	34%	64%	64%
Total Tasmanian apple exports (tonnes)	2,327	247	313	207	85	245	365	442	100%

Source: ABS (2017) via GTA; Fresh Intelligence analysis (2018) for FGT.

Table 13. Destination markets of Tasmanian apple export by total value of export (\$ 000's) between 2009 and 2017.

Protocol Market Value (\$ 000's)	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share
China	-	-	-	-	71	471	250	291	28%
India	1,348	-	115	122	-	-	53	-	0%
Indonesia	-	-	25	-	-	-	-	-	0%
Japan	341	-	-	-	-	-	-	65	6%
Philippines	-	-	-	-	-	-	-	-	0%
South Korea	-	-	-	-	-	-	-	-	0%
Taiwan	834	48	138	-	-	50	664	3	0%
Thailand	-	-	-	-	-	87	212	-	0%
Vietnam	8	66	14	62	-	23	-	-	0%
Total Protocol	2,531	114	292	185	71	631	1,178	359	35%
<i>Protocol share of Tasmania export</i>	80%	33%	72%	66%	27%	75%	77%	35%	
Unregulated Market Value (\$ 000's)	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	16/17 share
Brunei Darussalam	-	-	-	-	-	-	-	-	0%
Fiji	20	-	-	-	-	-	5	-	0%
Hong Kong	1.0	-	-	70	91	140	292	270	26%
Kiribati	2	-	5	8	-	8	0.3	-	0%
Malaysia	75	-	23	0.3	-	-	-	88	9%
Nauru	3	-	8	13	-	7	-	-	0%
Netherlands	-	-	-	-	-	-	-	-	0%
New Caledonia	17	11	-	-	-	2	-	-	0%
Papua New Guinea	133	42	52	3	13	-	0.79	24	2%
Qatar	-	4	-	-	-	-	-	-	0%
Singapore	74	-	-	-	85	58	-	0.1	0%
Sri Lanka	258	172	24	-	-	-	30	-	0%
United Arab Emirates	-	-	-	-	-	-	26	289	28%
United Kingdom	-	-	-	-	-	-	-	-	
All other	64	0.9	1	0.3	-	0.2	-	-	0%
Total Unregulated (tonnes)	647	230	112	94	189	215	355	670	
Unregulated share of Tasmanian export	20%	67%	28%	34%	73%	25%	23%	65%	
Total Tasmanian apple exports	3,178	344	405	279	260	846	1,533	1,029	100%

Source: ABS (2017) via GTA; Fresh Intelligence analysis (2018) for FGT.

4: Identifying Target Markets (cont.)

4.5 Australia's apple export competitors

Australia competes with both southern and northern hemisphere countries. From the southern hemisphere, New Zealand, Chile and South Africa are the main competitors. China, USA and Italy are key competitors from the northern hemisphere. Table 14 compares Australia's export in comparison to its competitors. Australia's share of apple export is just around 1% of these countries individually.

Comparing the volume and value (Table 15) of exported apple among these countries, Australia is a minor player in the global apple export market. A clean and green image and geographical proximity to Asia and Pacific countries are Australia's main competitive advantages. New Zealand, however, is the main competitor in Australian destination markets because of its strong export focus, similarity in image and proximity with Australia.

Table 14. Volumes of apples exported by Australia and competitors³

Export Volume (tonnes)	Jan - Dec 2012	Jan - Dec 2013	Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Change (last year)	5 year trend
Australia	3,914	3,254	1,890	4,080	5,688	39%	10%
China	975,878	994,664	865,048	833,021	1,322,042	59%	8%
United States	874,003	891,229	888,632	989,083	776,652	-21%	-3%
Italy	933,361	787,795	974,847	1,143,838	1,049,438	-8%	3%
Chile	761,984	833,251	820,184	629,046	764,813	22%	0%
New Zealand	309,464	350,011	336,785	358,508	380,994	6%	5%
South Africa	580,992	482,435	381,865	381,051	510,879	34%	-3%

Source: ABS (2017) via GTA; ITC Trademap; Fresh Intelligence analysis (2018) for FGT.

Table 15. Value of apple export by Australia's competitors (million USD)⁴

Export Market Value	Jan - Dec 2012	Jan - Dec 2013	Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Change (last year)	5 year trend
Australia	7.6	5.6	3.9	8.1	9.8	21%	6%
China	959.9	1,029.9	1,027.6	1,031.3	1,452.9	41%	11%
United States	1,086.5	1,121.1	1,086.1	1,026.3	935.5	-9%	-4%
Italy	936.6	933.7	975.2	960.3	917.2	-4%	-1%
Chile	728.9	843.3	822.3	591.5	663.6	12%	-2%
New Zealand	294.8	406.8	425.4	434.7	494.3	14%	14%
South Africa	333.5	443.3	353.7	318.2	358.7	13%	2%

Source: ABS (2017) via GTA; Fresh Intelligence analysis (2018) for FGT.

³Export volume calculated for Jan-Dec period for comparison

⁴Export value is calculated in USD for comparison

Competition from Northern Hemisphere

China

China is the world's largest producer and exporter of apples. Production exceeds 40 million tonnes and exports were 1.3 million tonnes in 2016, mostly to intra-Asian markets. China is Australia's largest export market for agricultural products. Australia and China have entered into a free trade agreement, which came into force in 2015. Australia imports more apples from China than it exports. In contrast, Australia does not feature in China's major apple export destinations. Similarly, China's share of Australia's apple export was just 3% in 2016/17. China is a major exporter of apple to Thailand, Indonesia, Hong Kong, Malaysia and Singapore, all major importers of Australian apples. Table 16 summarises China's major apple export destinations.

Table 16. *Apple exports from China by volume (tonnes).*

	Jan - Dec 2012	Jan - Dec 2013	Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Change (last year)	5 year trend	Share (%)
Total Apple Exports	975,878	994,664	865,048	833,021	1,322,042	59%	8%	
Thailand	80,367	92,626	83,051	103,443	142,202	37%	15%	10.8%
Philippines	69,883	92,623	61,519	69,229	133,622	93%	18%	10.1%
India	72,603	93,138	75,400	29,832	147,030	393%	19%	11.1%
Vietnam	76,430	81,556	74,253	86,076	110,032	28%	10%	8.3%
Bangladesh	80,761	85,672	93,068	129,173	181,437	40%	22%	13.7%
Russia	147,750	110,156	89,066	85,660	114,620	34%	-6%	8.7%
Indonesia	129,569	89,464	98,583	57,607	89,900	56%	-9%	6.8%
Myanmar	40	4,383	30,422	41,201	86,255	109%	581%	6.5%
North Korea	13,353	16,486	26,262	39,751	52,027	31%	40%	3.9%
Hong Kong	31,524	34,963	23,602	21,797	25,541	17%	-5%	1.9%
Nepal	29,842	35,483	29,691	29,693	56,287	90%	17%	4.3%
Kazakhstan	72,487	87,852	66,543	45,495	46,234	2%	-11%	3.5%
Malaysia	29,431	38,205	25,121	21,955	34,440	57%	4%	2.6%
Singapore	17,463	18,958	17,099	13,372	18,197	36%	1%	1.4%
All other	112,476	105,936	75,649	61,238	83,390	36%	-7%	6.3%
Total (Tonnes)	975,878	994,664	865,048	833,021	1,322,042	59%	8%	100%

Source of data: ITC Trademap; Fresh Intelligence analysis (2018) for FGT.

4: Identifying Target Markets (cont.)

United States of America

The USA is a large producer, exporter and importer of apples. Almost half the exports are to North America (Mexico and Canada) and an increasing portion is sent to Asian markets with increasing volumes to China since the market reopened to USA apples. Table 17 summarises USA's major apple export destinations.

Table 17. *Apple exports from USA by volume (tonnes).*

	Jan - Dec 2012	Jan - Dec 2013	Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Change (last year)	5 year trend	Share (%)
Total Apple Exports	874,003	891,229	891,229	989,083	776,652	-21%	-3%	
Mexico	241,441	279,240	279,240	305,616	212,476	-30%	-3%	27.4%
Canada	140,951	154,499	154,499	146,068	151,209	4%	2%	19.5%
Taiwan	67,242	64,481	64,481	61,661	56,583	-8%	-4%	7.3%
India	85,104	56,978	56,978	104,371	57,955	-44%	-9%	7.5%
Indonesia	57,762	35,150	35,150	26,328	40,402	53%	-9%	5.2%
Hong Kong	47,785	37,685	37,685	45,593	31,883	-30%	-10%	4.1%
Viet Nam	10,781	22,094	22,094	26,397	24,199	-8%	22%	3.1%
United Arab Emirates	31,929	49,161	49,161	55,674	24,994	-55%	-6%	3.2%
Dominican Republic	13,338	13,119	13,119	17,647	19,569	11%	10%	2.5%
China	3,535	800	800	20,297	16,035	-21%	46%	2.1%
Saudi Arabia	13,529	18,356	18,356	26,039	17,880	-31%	7%	2.3%
Thailand	19,864	18,998	18,998	22,720	16,169	-29%	-5%	2.1%
All other	140,742	140,668	140,668	130,672	107,298	-18%	-7%	13.8%
Total (Tonnes)	874,003	891,229	891,229	989,083	776,652	-21%	-3%	100%

Source of data: ITC Trademap; Fresh Intelligence analysis 2018 for FGT.

Italy

Italy is the second largest exporter of apple by volumes and the largest in Europe. Italy has been under greater price pressure since 2014 with the closure of the Russian market that accounted for around 20% of European apple exports. Table 18 summarises Italy's major apple export destinations. UK and UAE are the main Australian apple importers where Italy also exports in significant quantity.

Table 18. Apple exports from Italy by volume (tonnes).

	Jan - Dec 2012	Jan - Dec 2013	Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Change (last year)	5 year trend	Share (%)
Total Apple Exports	933,361	787,795	974,847	1,143,838	1,049,438	-8%	3%	
Germany	250,871	269,914	282,539	304,561	256,973	-16%	1%	24.5%
Spain	75,630	83,982	71,246	81,391	107,552	32%	9%	10.2%
Saudi Arabia	25,195	19,103	35,563	48,014	56,732	18%	22%	5.4%
Egypt	45,342	15,617	93,899	129,110	87,822	-32%	18%	8.4%
United Kingdom	35,473	26,876	28,827	33,190	30,840	-7%	-3%	2.9%
Sweden	37,201	27,615	32,573	37,763	33,743	-11%	-2%	3.2%
Norway	25,539	22,353	24,855	28,984	25,355	-13%	0%	2.4%
Brazil	3,351	1,740	8,120	4,030	26,695	562%	68%	2.5%
United Arab Emirates	10,774	6,886	18,734	21,522	24,819	15%	23%	2.4%
Netherlands	18,652	21,633	19,995	22,558	25,623	14%	8%	2.4%
Jordan	6,042	2,740	19,309	24,987	30,127	21%	49%	2.9%
France	34,986	31,399	18,671	33,626	34,164	2%	-1%	3.3%
Denmark	26,332	20,282	21,905	20,728	18,400	-11%	-9%	1.8%
Algeria	33,768	35,420	47,570	60,888	22,841	-62%	-9%	2.2%
Libya	51,468	54,230	51,147	38,860	19,011	-51%	-22%	1.8%
Austria	7,994	9,121	12,441	13,269	34,857	163%	45%	3.3%
India	1,140	441	3,955	10,728	13,927	30%	87%	1.3%
Finland	13,176	8,536	11,503	16,858	15,298	-9%	4%	1.5%
Israel	5,857	5,389	7,909	5,127	10,310	101%	15%	1.0%
Czech Republic	24,471	12,720	13,923	24,425	16,195	-34%	-10%	1.5%
All other	175,317	107,395	143,835	163,599	143,944	-12%	-5%	13.7%
Total (Tonnes)	933,361	787,795	974,847	1,143,838	1,049,438	-8%	3%	100%

Source of data: ITC Trademap; Fresh Intelligence analysis 2018 for FGT.

4: Identifying Target Markets (cont.)

Competition from Southern Hemisphere

Chile

Chile is the largest apple producer and exporter in the Southern Hemisphere. While the USA is Chile's largest market destination, Chilean apples are widely distributed through the Americas, Europe and Asia. Table 19 summarises Chile's major apple export destinations.

Table 19. *Apple exports from Chile by volume (tonnes).*

	Jan - Dec 2012	Jan - Dec 2013	Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Change (last year)	5 year trend	Share (%)
Total Apple Exports	761,984	833,251	820,184	629,046	764,813	22%	0%	
United States	122,443	134,198	120,899	79,075	106,519	35%	-3%	13.9%
Brazil	18,271	39,011	42,555	35,771	86,261	141%	47%	11.3%
Colombia	75,211	86,146	90,785	75,593	76,371	1%	0%	10.0%
Chinese Taipei	44,871	52,367	52,527	39,332	49,899	27%	3%	6.5%
Netherlands	50,052	77,238	64,817	43,409	46,164	6%	-2%	6.0%
Saudi Arabia	47,368	54,308	33,803	39,981	47,075	18%	0%	6.2%
Peru	40,094	36,356	46,810	43,715	47,901	10%	5%	6.3%
Ecuador	47,563	52,950	60,532	41,589	37,917	-9%	-6%	5.0%
United Kingdom	25,946	26,353	41,152	25,373	27,149	7%	1%	3.5%
Canada	16,275	26,034	18,855	10,528	22,648	115%	9%	3.0%
India	22,455	16,490	47,907	19,997	32,189	61%	9%	4.2%
Russia	34,600	33,440	15,202	26,076	20,632	-21%	-12%	2.7%
China	17,530	17,097	15,875	22,524	16,327	-28%	-2%	2.1%
France	6,619	11,269	10,038	11,158	12,800	15%	18%	1.7%
United Arab Emirates	24,626	20,653	17,315	11,385	13,442	18%	-14%	1.8%
All other	159,241	145,064	134,166	94,173	111,862	19%	-8%	14.6%
Total (Tonnes)	761,984	833,251	820,184	629,046	764,813	22%	0%	100%

Source of data: Fresh Intelligence analysis (2018) for FGT based on Chile Customs- Servicio Nacional de Aduana via ITC Trademap.

New Zealand

New Zealand, an export focussed country, is now considered Australia's strongest direct competitor. Although its strongest markets have traditionally been Europe, increased competition from Chile has influenced New Zealand exporters to refocus on Asia, particularly Taiwan and China where there has been significant growth. New Zealand primarily competes with Australia for markets in UK, UAE, China, Hong Kong, Singapore and Indonesia. Table 20 summarises New Zealand's major apple export destinations.

Table 20. *Apple exports from New Zealand by volume (tonnes).*

	Jan - Dec 2012	Jan - Dec 2013	Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Change (last year)	5 year trend	Share (%)
Total Apple Exports	309,464	350,011	336,785	358,508	380,994	6%	5%	
United States	37,082	42,548	44,306	35,130	53,319	52%	10%	14.0%
United Kingdom	48,002	47,862	45,323	51,284	47,432	-8%	0%	12.4%
Taiwan	13,254	9,524	21,717	23,956	34,983	46%	27%	9.2%
Netherlands	31,600	43,219	40,622	32,152	32,035	0%	0%	8.4%
Europe Other	32,599	30,511	30,846	27,443	28,635	4%	-3%	7.5%
Thailand	23,683	29,031	21,820	32,423	27,209	-16%	4%	7.1%
United Arab Emirates	14,230	19,497	12,408	20,412	19,391	-5%	8%	5.1%
China	1,623	10,640	2,147	22,234	19,160	-14%	85%	5.0%
India	19,478	16,112	13,442	16,217	14,352	-12%	-7%	3.8%
Germany	9,604	11,205	11,938	9,621	13,285	38%	8%	3.5%
Hong Kong	15,420	12,224	11,579	11,457	11,163	-3%	-8%	2.9%
Singapore	8,053	8,759	9,470	9,053	9,884	9%	5%	2.6%
Indonesia	4,101	4,204	3,321	4,089	9,356	129%	23%	2.5%
Vietnam	3,196	4,057	9,058	4,610	9,182	99%	30%	2.4%
Russia	4,898	6,852	9,093	8,353	6,327	-24%	7%	1.7%
All other	42,641	53,766	49,695	50,074	45,281	-10%	2%	11.9%
Total (Tonnes)	309,464	350,011	336,785	358,508	380,994	6%	5%	100%

Source of data: ITC Trademap; Fresh Intelligence analysis (2018) for FGT.

4: Identifying Target Markets (cont.)

South Africa

South Africa is one of the top 10 exporters of apple. Table 21 summarises South Africa's major apple export markets. The UK is its main destination. Malaysia, UAE and Singapore are other export destinations where it competes with Australia.

Table 21. *Apple exports from South Africa by volume (tonnes).*

	Jan - Dec 2012	Jan - Dec 2013	Jan - Dec 2014	Jan - Dec 2015	Jan - Dec 2016	Change (last year)	5 year trend	Share (%)
Total Apple Exports	580,992	482,435	381,865	381,051	510,879	34%	-3%	
United Kingdom	97,949	107,396	65,197	67,926	107,614	58%	2%	21.1%
Malaysia	41,024	46,450	43,776	35,910	51,290	43%	6%	10.0%
Nigeria	7,857	32,361	43,624	75,398	41,121	-45%	51%	8.0%
United Arab Emirates	19,285	23,947	16,227	13,236	23,207	75%	5%	4.5%
Bangladesh	10,766	8,369	10,276	9,035	25,082	178%	24%	4.9%
Netherlands	16,425	33,368	12,170	6,462	16,773	160%	1%	3.3%
Kenya	7,860	10,384	11,169	12,137	18,166	50%	23%	3.6%
Chinese Taipei	3,374	6,212	5,390	9,027	13,495	49%	41%	2.6%
Senegal	8,779	9,692	8,074	5,738	13,342	133%	11%	2.6%
Singapore	11,575	12,549	12,084	6,724	11,378	69%	0%	2.2%
Russia	7,496	7,195	4,512	5,935	14,739	148%	18%	2.9%
Zambia	8,195	10,069	12,392	8,695	14,113	62%	15%	2.8%
All other	340,407	174,443	136,974	124,828	160,559	29%	-17%	31.4%
Total (Tonnes)	580,992	482,435	381,865	381,051	510,879	34%	-3%	100%

Source of data: ITC Trademap; Fresh Intelligence analysis (2018) for FGT.

Section 5: Identifying Importing Country Requirements

5.1 Types of export market

Export market destinations are divided into two broad categories – protocol and non-protocol countries - based on the regulated requirements for export.

Regulated protocol markets

Indonesia, Thailand, China, Japan, India, Canada and Taiwan are regulated protocol markets that have specific phytosanitary and market access requirement in place to export apples from Australia. Exporters aiming at these markets need to have their apple orchard, packhouse, cold storage and treatment facilities registered to meet the protocol requirements. These requirements, however, vary among importing nations.

Unregulated (non-protocol) markets

Non-protocol countries offer less stringent requirements for export compared to protocol countries. Hong Kong, Singapore, and Malaysia are unregulated markets, and constitute strategic export markets for Australian producers as they are net importers of fresh apple, have high purchasing power and preferences for premium agricultural products. Australia exported 924 tonnes of apple to these countries in a year to April 2017. United Kingdom, PNG, UAE, Netherlands, New Caledonia, Fiji, Qatar, Saudi Arabia, Sri Lanka, Brunei Darussalam and Pacific Island nations are non-protocol markets that still require phytosanitary certificates (Fresh Intelligence Analysis, cited from APAL website). In terms of value of export in 2016, the UK ranks highest among Australia's apple importers. With the inevitable Brexit scenario, UK – a traditional trade partner of Australia, offers high export growth opportunity for apple exporters. Papua New Guinea ranks second in terms of total value of Australian apple exports in 2016, and is another strategically important country due to geographical proximity to Australia. Gulf nations such as UAE, Qatar and Saudi Arabia, although historically not very significant importers, always present opportunities for exporters of premium quality apples since import is the only available source to meet domestic apple consumption demand in these countries.



Section 5: Identifying Importing Country Requirements (cont.)

5.2 Manual of Importing Country Requirements – MICoR

MICoR (Plants) contains information about the conditions to export plants and plant products, including fruit, vegetables, seeds, grains, cut flowers and timber from Australia. It is a simple and convenient reference tool detailing the requirements for Import Permits, Phytosanitary Certificates, Additional Declarations and/or treatments, and also any other relevant export information and documentation, such as protocols.

Growers and packhouses can use MICoR to access relevant work plan and protocol(s) on the *Manual of Importing Country Requirements (MICoR) Plants* website for specific market requirements. To access these documents, you must be a registered MICoR Plant user. To register, go to the registration webpage <https://micor.agriculture.gov.au/Pages/Apply-for-access.aspx>.

Exporters must meet both the requirements of the *Export Control Act (1982)* and its subordinate legislation and any importing country quarantine requirements for DAWR to provide the necessary documentation to enable products to be exported. The Australian Government is a signatory to the *International Plant Protection Convention (IPPC)*, and strongly supports international cooperation in controlling pests of plants and plant products through science based quarantine measures that will prevent the unintended spread of pests to other countries through imported products.

If importing country requirements of a particular country or commodity are not contained in *MICoR Plants*, exporters should seek information regarding any specific quarantine requirements of the importing country from the relevant quarantine authority.

Searching for a specific case:

- Select the required **Country** - to expand the list click Show More and scroll through the list (Only the linked **Group** will be displayed)
- Select the required **Group** (if applicable) - expand the list click Show More and scroll through the list (Only the linked **End Use** will be displayed)
- Select the required **End Use** (if applicable) - to expand the list click Show More and scroll through the list (Only the linked cases will be displayed)
- Select the required case under **Scientific Name / Common Name** - to expand the list click Show More and scroll through the list
- The result or results will automatically be displayed under the **Recent results** heading
- Click the hyperlinked text to display the specific case
- Searches can be conducted at any level. e.g. Country and Group only; Country and End Use only; Country only

5.3 International market access and requirements for exporting apples

The Australian Government's DAWR is responsible for negotiating new market access for Australian apples and pears. DAWR is also responsible for seeking improvements, where appropriate, for existing conditions in markets where Australia already has access.

Different export markets have different requirements for the importation of Australian apples and pears, some of which are outlined here. Growers and exporters are advised to talk with their importers about any additional requirements (such as retailer specifications) that need to be met.

Importing country	Major Phytosanitary Requirements
Canada	Phytosanitary certificate, methyl bromide fumigation for light brown apple moth (for apples only) and cold storage.
China	Tasmania only. Phytosanitary certificate, orchard and facility registrations, area freedom (or cold treatment) for Medfly and Qfly, monitoring and control for codling moth, and orchard management for light brown apple moth, brown rot and woolly apple aphid.
European Union	Phytosanitary certificate.
Fiji	Phytosanitary certificate; either grown in an area free from fruit flies or cold treatment.
Hong Kong	No phytosanitary conditions.
India	Phytosanitary certificate, import permit and specific conditions for Qfly, Medfly, codling moth, light brown apple moth and scarlet mealybug. Fruit fly area freedom (Tasmania, Riverina, Riverland or Sunraysia) or on-shore cold treatment plus in-transit refrigeration.
Indonesia	General conditions for all fresh fruit imports. Phytosanitary certificate, sourced from fruit fly pest free areas (Riverland, Riverina, Sunraysia or Tasmania) or treated (cold, methyl bromide fumigation or heat).
Japan	Tasmania only. Phytosanitary certificate; fumigation (for codling moth) and pre-clearance.
Malaysia	General conditions for all fresh fruit imports.
New Zealand	Phytosanitary certificate; cold treated or sourced from fruit fly pest free areas (Riverland or Tasmania).
Pakistan	Phytosanitary certificate, import permit and freedom from specified pests and diseases.
Papua New Guinea	Phytosanitary certificate, import permit, fumigated with methyl bromide and kept in cold storage.
Russia	Phytosanitary certificate.
Singapore	No phytosanitary conditions.
Solomon Islands	Phytosanitary certificate, import permit and cold treatment or methyl bromide fumigation.
Sri Lanka	Phytosanitary certificate, import permit, sourced from fruit fly pest free area or cold treatment, and cold storage during shipping.
Taiwan	Tasmania and Riverland only. Phytosanitary certificate; sourced from fruit fly pest free area or cold treated (treatment accepted for Medfly but currently not for Qfly).
Thailand	Phytosanitary certificate, registration and audits, orchard management, sourced from a fruit fly pest free area or cold treatment, on-shore or in-transit cold treatment.
Tuvalu	Phytosanitary certificate and import permit.
United Arab Emirates	Phytosanitary certificate.
United Kingdom	As for the European Union.
United States	Phytosanitary certificate, import permit, freedom from light brown apple moth, sourced from a fruit fly pest free area (Riverland and Tasmania) or cold treatment.
Vanuatu	Phytosanitary certificate; either grown in an area free from fruit flies or cold treatment.
Vietnam	Trade suspended since December 2014.

*Source: Review of apple and pear industry's market access and biosecurity R&D portfolio, Kalang Consultancy Services, 2012.

6: Registering your Business for Export

6.1 Export registration for protocol markets

Applications for export approval of apple orchards, packing houses and treatment facilities to protocol markets.

Orchards, packhouses, cold stores and fumigation facilities intending to export apples to China, Japan, Taiwan or Thailand, or orchards and packhouses intending to export pears to Thailand in the 2017 to 2018 season, must submit an export application form to DAWR by **August (Tasmania)** and **November (mainland Australian producers)**. Applications must be completed and submitted using the online application system. Late applications will not be accepted.

DAWR can only approve an entity for export if all protocol requirements are met. An orchard or packhouse will be export-approved by DAWR once all requirements have been audited and verified in accordance with the protocol. All costs associated with this audit process are the responsibility of the applicant.

Tasmanian export entities must submit an annual application for export approval. Please use the export application form attached in Appendix 9.2. Forms must be completed and returned to Fruit Growers Tasmania (FGT) by the specified date.

FGT contact information

- Email: ian@fruitgrowerstas.org.au
- Phone: **(03) 6169 2059**

Previous season users will also receive an email and SMS notifications from Apple and Pear Australia Limited (APAL) advising when annual export registrations commence. Growers and packhouses that have not used this system but wish to do so should contact APAL to obtain an Apple / Pear (AP) registration number to access the online registration system.

APAL contact information

- Email: acrawford@apal.org.au
- Phone: **(03) 9329 3511**

6.2 EXDOC – Export Documentation System

The Department of Agriculture and Water Resources' (DAWR) Export Documentation System (EXDOC) is used to generate export documents for export prescribed primary produce from Australia.

This may include:

- Export permits
- Certificates and related documents as required by importing countries.

Commodities included in EXDOC are:

- Horticulture
- Grains
- Dairy
- Eggs
- Meat
- Seafood
- Inedible meat products
- Skins and hides
- Wool.

Registering in EXDOC

You can apply for different levels of access to EXDOC, depending on how much of the export documentation process you want to complete yourself.

Register as an:

- Exporter — your name and address will be included as the exporter/owner on any documents generated for you.
- EDI user — to generate requests for export permits, certificates and related documents.
- Exporter and EDI user — your name and address will be registered in the EXDOC system as an exporter and you will be able to request export permits, certificates and related documents.

Costs of using EXDOC

There are two sets of costs associated with using EXDOC:

- Fees and charges for requesting export permits and related documentation are administered by DAWR. Consult DAWR's charging guidelines for costs associated with export documentation.
- Cost of purchasing EXDOC software will vary depending on the software supplier. Contact EXDOC software suppliers for prices.

6: Registering your Business for Export (cont.)

Linking EXDOC and Integrated Cargo System

Users of both EXDOC and the Department of Immigration and Border Protection's Integrated Cargo System (ICS) can link the two systems by requesting access to Single Electronic Window (SEW).

If you want to register in EXDOC as an EDI user, you will need to buy a software package to communicate with EXDOC from an accredited EXDOC software supplier. This must be done before you submit your application form.

Check DAWR's advice on considerations when choosing an EXDOC software system.

After you purchase the software, DAWR will:

- issue your unique EDI user number
- direct you to the correct area for EDI knowledge testing

EXDOC users should contact their software supplier for details on:

- delivery of software updates
- and any associated fees applicable for completing updates

EXDOC Help Desk

The EXDOC help desk provides support to clients using the EXDOC system for the creation and processing of Requests for Permit (RFPs). In-office support is available Monday to Friday between the hours of 8.00am to 6.00pm (Eastern Standard Time). On-call officer support is provided outside these hours for product leaving before next business day.

Contact numbers for the helpdesk are:

Contact Information

For horticulture, grain, dairy, fish, and eggs RFP support

- Email: **EXDOC.Helpdesk@agriculture.gov.au**
- Phone: **(02) 6272 4700**
- Fax: **(02) 6272 5773**

6.3 DAWR audit process

Growers, packhouses and onshore cold treatment facilities applying for export approval will be subject to audit by the department to ensure compliance with the relevant protocol and workplan and must be familiar with DAWR auditing requirements. Audits are conducted during a fortnightly period, normally commencing in September for growers, packhouses and treatment facilities in mainland Australia and October for growers and packhouses in Tasmania. Applicants must be available during this time and have all records (electronic and/or hard copy) available at the time of audit where applicable.

Pre-Audit Checklist for Orchards

Item	Comment(s)	Completed (Y/N)
Have a copy of the relevant work plans/protocols		
Documented traceability system from orchard to packhouse (including forwarding copies of their application to the packhouse)		
Crop monitoring records for monitoring/trapping for pests of concern		
IPM/GAP		
Spray records (including calibration records)		
Staff training records on quarantine pest/disease		
Procedure for when pest thresholds reached		

6: Registering your Business for Export (cont.)

Pre-Audit Checklist for Packhouses:

Item	Comment(s)	Completed (Y/N)
Have a copy of the relevant work plans/protocols		
Copies of grower applications		
SOPs relevant to grading, handling and packing fruit		
Documented processes to maintain basic hygiene and sanitary conditions of the premises Fruit receival records		
Documented traceability process		
QA/HACCP procedures (please note that Freshcare, Global G.A.P, etc. will count towards this)		
Appropriate inspection tools and inline inspection records		
Load out records		
Correct labelling for export fruit as per importing country requirements		

7: Registering your Business for Export

7.1 Orchard pest monitoring and hygiene

Despite its 'clean, green' image, Australian apple orchards are home to several species of insect, fungi and nematodes of biosecurity concern to our overseas trade partners. These pests of quarantine significance are listed in Table 22. Fact sheets on these pests are included in the 10.3.1 Pest Species Information Sheets.

These pests are located in most apple production regions of Australia. Apple producers whose orchards and/or packing facilities are located in regions where these pests are present must undertake continuous pest monitoring and control activities throughout the growing and harvesting period, have fruit treated in accordance with country-specific guidelines, and may face restricted market access. Apple producers whose orchard and packhouse facilities are located in internationally-recognised areas with PFA status can be exempt from monitoring, control and treatment activities, and may have improved market access.

Pest monitoring and control activities for export markets must be carried out by persons registered for the provision of crop monitoring services for apples and pears. This training is available online in Australia through TOCAL College (www.tocal.nsw.edu.au). Crop monitoring methods vary for different pest species; the methods are summarised in Appendix 10.3.2. Pest Species Monitoring Methods. Specific details regarding pest monitoring practices can vary between destination markets; for up-to-date information about specific country requirements contact DAWR Horticultural Exports Program on: HorticultureExportsProgramACT@agriculture.gov.au.

Table 22. Pests of quarantine concern to protocol markets.

Common Name	Scientific Name	China	Japan	Thailand	Taiwan
Brown Rot	<i>Monilinia fructicola</i>	✓			
Budworm Helicoverpa	<i>Helicoverpa punctigera</i>			✓	
Burrowing nematode	<i>Radopholus similis</i>				✓
Canker of almond	<i>Botryosphaeria dothidea</i>			✓	
Codling moth	<i>Cydia pomonella</i>	✓	✓	✓	✓
European fruit lecanium	<i>Parthenolecanium corni</i>			✓	
Fuller's rose beetle	<i>Pantomorus cervinus</i>			✓	
Jarvis' fruit fly	<i>Bactrocera jarvisi</i>			✓	
Lesser Queensland fruit fly	<i>Bactrocera neohumeralis</i>			✓	
Light brown apple moth	<i>Epiphyas postvittana</i>	✓		✓	
Mauve pittosporum scale	<i>Parlatoria pittospori</i>			✓	
Mediterranean fruit fly	<i>Ceratitis capitata</i>	✓	✓	✓	✓
Oystershell scale	<i>Lepidosaphes ulmi</i>			✓	
Pear oyster scale	<i>Diaspidiotus ostreaeformis</i>			✓	
Plague thrips	<i>Thrips imaginis</i>			✓	
Potato cyst nematode	<i>Globodera rostachiensis</i>				✓
Privet mite	<i>Brevipalpus obovatus</i>			✓	
Queensland fruit fly	<i>Bactrocera tryoni</i>	✓	✓	✓	✓
San Jose Scale	<i>Quadraspidiotus perniciosus</i>				
Scarlet mealybug	<i>Pseudococcus calceolariae</i>			✓	
Stem Nematode	<i>Ditylenchus dipsaci</i>				✓

7: Registering your Business for Export (cont.)

Table 22 (cont.) Pests of quarantine concern to protocol markets.

Common Name	Scientific Name	China	Japan	Thailand	Taiwan
Western flower thrips	<i>Frankliniella occidentalis</i>				✓
White fringed beetle	<i>Naupactus leucoloma</i>				✓
Woolly Aphid	<i>Eriosoma lanigerum</i>	✓			

7.2 Agrichemical use

Spray Program

The use of agricultural pesticides must comply with various state and federally administered legislation, in particular, the use of an agricultural pesticide must be in accordance with the current approved label unless approved under appropriate legislation, for example state control of use. The producer must be able to demonstrate appropriate legislation/documents that allow the legal use of a pesticide, for example a permit from the Australian Pesticides and Veterinary Medicines Authority (APVMA) or an extract from the state control of use legislation.

Below is a summary of the agrichemicals registered for use for apple production in Australia, as well as the active ingredient, withholding period, mode of action and target pest. For up-to-date information on individual agricultural pesticides and their approved use patterns please consult the APVMA's Public Chemical Registration Information System (PubCRIS) database, which is available online at <https://portal.apvma.gov.au/pubcris>.

Table 23. Plant growth regulators (PGR) and thinners registered for use in apple.

Thinners	PGRs	Trade Name	Active Ingredient	Australian WHP	Mode of Action Group	Comments
		Carbaryl, Bugmaster	carbaryl	77	1A	
		MaxCel	6-benzyladenine	NR	PGR	Use at >15°C & king fruitlets are 7–10mm diameter
		Ethrel	ethephon	7	PGR	
		NAA, Stop-Drop	NAA	1	PGR	
		Thin-It	ammonium thiosulfate	NR	PGR	
		Regalis	prohexadione-calcium	56	PGR	Spray when terminal shoots are 3-5cm long
		Paclotar	paclobutrazol	21	PGR	
		Retain	Aminoethoxy vinylglycine	7	PGR	
		Cytolin, Perlan	gibberellins A ₄ & A ₇	NR	PGR	

Table 24. Fungicide's registered for use on apples before harvest.

Black Spot	Ripe Spot	Powdery Mildew	Core Rot	Trade Name	Active Ingredient	Australian WHP	Mode of Action Group	Comments
				Lime Sulphur	Lime Sulphur	budswell	C	
				Bogard	difenoconazole	28	C	Use Bogard with protectant after petalfall
				Viva	hexaconazole	7	C	Group C (DMIs) Stop at 4 sprays per season
				Rubigan	fenarimol	14	C	
				Saprol	triforine	1	C	Can cause russetting
				Systhane	myclobutanil	21	C	
				Topas	penconazole	14	G	
				Pristine	boscalid pyraclostrobin	28	K	Note: Pristine is a Group G and Group K fungicide
				Nimrod	bupirimate	7	H	
				Chorus	cyprodinil	1	I	
				Stroby	kresoxim-methyl	42	K	Group K (strobylurines) Stop at 3 sprays / season
				Flint	trifloxystrobin	35	K	
				Syllit	dodine	5	X	
				Captan	captan	7	Y	Can cause russetting
				copper	various	1	Y	
				Delan	dithianon	21	Y	
				Dithane	mancozeb	14	Y	To protect predatory mites, dont use after bloom
				Thiragranz	thiram	7	Y	
				Polyram	metiram	21	Y	
				Sulphur	wettable sulfur	0	Y	

Table 25. Plant growth regulators (PGR) and thinners registered for use in apple.

Trade Name	Active Ingredient	Australian WHP	Mode of Action Group	Comments
Scholar	fludioxonil	0	12	
Rovral, Civit	iprodione	0	Y	
Tecto	thiabendazole	0	A	
Fungazil	imazalil	0	C	
No Scald	DPA	0	PGR	
SmartFresh	1 MCP	0	PGR	

7: Registering your Business for Export (cont.)

Table 26. Fungicides registered for use on apples before harvest.

LBAM	Codling Moth	Looper	Apple Dimpling Bug	Canary Fly	Weevils	Woolly Aphid	Pest Mites	Trade Name	Active Ingredient	Australian WHP	Mode of Action Group	Comments
								Altacor	chlorantraniliprole	14		Delegate and Altacor limited to 3 sprays per season
								Delegate	spinetoram	7	5A	
								Avatar	indoxacarb	14	22A	
								Insegar	fenoxycarb	14	7B	Don't use after NOV for Taiwan (or China)
								Lorsban 750WG	chlorpyrifos 750 WG	14	1B	Leave bringing in bees for 3 or more days after spraying chlorpyrifos
								Mimic	tebufenozide	21	16A	
								Pheromone Ties	(Isomates)		N/A	No withholding periods required for ties
								Prodigy	methoxy-fenozide	14	16A	
								Success	spinosad	3	5A	
								Calypso	thiacloprid	21	4A	Use half label rate on canary fly
								Gusathion	azinphos-methyl	14	1B	
								Samurai	clothianidin	21	4A	
								Mavrik	fluvalinate (tau)	blossom	3A	Do not use after 20% bloom
								Confidor	imidacloprid	NR	4A	
								Pirimor	pirimicarb	2	1A	For best results spray at >15°C and use high volume

Table 27. Miticides registered for use in apples before harvest.

Trade Name	Active Ingredient	Australian WHP	Mode of Action Group	Comments
Oil	petroleum oil	1		Use at late budswell
Acramite	bifenazate	7	2D	
Kill-a-mite	abamectin	14	6A	
Calibre	hexythiazox	3	10A	
Apollo	clofentezine	21	10A	
Paramite	etoxazole	21	10A	
Pyranica	tebufenpyrad	14	10A	
Secure	chlorfenapyr	14	13A	
Omite	propargite	7	14A	

Maximum Residue Limits (MRL)

The Maximum Residue Limit (MRL) is the highest concentration of a residue of a particular chemical that is legally permitted or accepted in a food or animal feed. MRLs are regulatory standards monitored by governments to ensure that agrichemical products have been used in accordance with regulatory requirements and label instructions. MRLs are expressed as milligrams of chemical residue per kilogram (mg/kg) within the commodity. Exceeding an MRL does not necessarily constitute a public health or safety concern, but typically indicates a misuse of the chemical outside of regulatory guidelines.

In Australia, APVMA is the regulator overseeing agrichemical registration and compliance. The APVMA determines an MRL after a comprehensive evaluation of an agrichemical product's chemistry, metabolism, analytical methodology and residue trial data. When evaluating these products, the APVMA uses data from a series of residue trials to calculate the minimum amount of chemical that is required to achieve effective pest or disease control, and whether the application or administration of will leave any residue in the plant or animal commodity.

Australian MRLs for plant or animal commodities are specified in part 2 of the Agricultural and Veterinary Chemicals Code Instrument No. 4 (MRL Standard) 2012. MRL residues for major export destinations can be found online at:

Destination	Web Address
UK	https://secure.pesticides.gov.uk/MRLs/search.asp
EU	http://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/public/?event=homepage&language=EN
Taiwan	https://www.fda.gov.tw/EN/lawContent.aspx?cid=16&id=304
Japan	http://www.ffcr.or.jp/zaidan/FFCRHOME.nsf/pages/MRLs-p
China	http://nwhort.org/export-manual/comparisonmrls/apple-mrls/

A list of agrichemical MRLs for major apple export destinations is provided in Appendix 10.3.3 Agrichemical MRLs for apples in overseas markets.

Withholding Periods (WHP)

A withholding period (WHP) is the minimum amount of time that must elapse between the last treatment with a chemical product and the harvest or grazing of a crop or animal. In Australia, WHPs are set by the APVMA to ensure agrichemical residues can deplete levels below the MRL before sale or consumption. By complying with this withholding period, growers permit the residues in plant or animal commodities to decrease below the MRL level.

A list of withholding periods for major apple export destinations is provided in Appendix 10.3.4 Agrichemical WHPs for apples in overseas markets.

The National Residue Survey (NRS)

The National Residue Survey (NRS) is a vital part of the Australian system for managing the risk of chemical residues and environmental contaminants in Australian animal and plant products. The core work of the NRS is to facilitate the testing of animal and plant products for pesticides, veterinary medicine residues, and environmental contaminants. The NRS aims to:

- provide an estimate of the occurrence of residues in products (using systems based on sampling and statistical probability)
- confirm (or otherwise) that residues in products are below set limits
- alert responsible government authorities and industry if, and when, limits are exceeded, so that corrective action can be taken.

Product residue testing is carried out using specifically designed sampling protocols, or through randomised sampling. This testing supports Australia's primary producers and agricultural industries by confirming Australia's status as a producer of clean food and facilitating access to domestic and export markets. Other programs within the NRS, including laboratory evaluation and business activities, support the core work of residue testing.

The NRS became an industry-funded activity in 1992 following the enactment of the National Residue Survey Administration Act 1992 (Admin Act). Since this time, participating industries have funded NRS residue monitoring programmes and associated activities through statutory levies on primary production and exports, or through direct contract arrangements. All funds collected for this purpose are held in a specific account and are only expended on residue monitoring activities. The relevant levy acts and regulations are:

- National Residue Survey (Customs) Levy Act 1998
- National Residue Survey (Excise) Levy Act 1998
- Primary Industries Levies and Charges (National Residue Survey Levies) Regulations 1998.

Levy rates are established in consultation with participating industries in accordance with the Australian Government's Levies Principles and Guidelines, Policy for the Management of New and Amended Levies within Australia. The DAWR Levies Revenue Section coordinates the collection of levies for the NRS and other levy-funded organisations on a fee-for-service basis. To ensure equity, levies are held in the NRS Special Account and are accounted for on an industry-by-industry basis.

7.3 Cultivar selection and maturity

Cultivars

Commercial apple production for export is all about producing good quality fruit that meets market demand and consumer acceptance in a profitable way. Cultivar selection is one of the most critical aspects of any apple orchard's profitability. Information on different commercial cultivar options from APAL are attached in Appendix 10.3.5 Apple Cultivars.

Before establishing any orchard it is essential to consider what market niche you believe is going to provide you with the best financial returns. Growing cultivars that are accepted in a wide variety of overseas export markets generally provide the greatest marketing flexibility, as these cultivars can be sold in any market. Cultivars that have market potential in only one or two markets offer the least marketing flexibility.

The targeted international market niche will influence what cultivars to select for export. If you intend to grow club cultivar apples, you must need to discuss the respective marketing manager for that variety. Additional information about market opportunities for established cultivars can be obtained from wholesale agents, packhouses, exporters, and regional industry bodies.

Maturity and Harvest Index

The timing of harvest is critical to the quality and post-harvest life of apples. As a climacteric fruit, apples can be harvested once they reach physiological maturity and before they are horticulturally mature, or 'ripe' and ready for consumption. Eating quality is closely related to the ripening stage of the fruit. Apple producers can use multiple indices to determine harvest maturity. These indices include firmness, background colour, soluble sugar concentration, and starch index. It is recommended that growers consider using multiple indices when estimating fruit maturity, since each has limitations. Further information on these processes and harvest maturity indices can be found in Nisson R, Bound S, Adhikari R, and Cover I. (2018). *Factors affecting post-harvest management of apples: a guide to optimising quality*. Australian Department of Agriculture and Water Resources Canberra, ACT.



Figure 5. Apple harvest, picking and seasonal availability for major export cultivars. Image courtesy of Apple and Pear Australia Ltd. (APAL).

7.4 Apple storage and handling

Apple storage and preparation processes used to supply export markets are designed around maintaining fruit freshness, appearance and eating quality whilst complying with phytosanitary requirements for export market(s). Key processes are:

1. Storage
2. Removal from storage
3. Washing
4. Grading
5. Waxing
6. Sorting
7. Packing

These processes are summarised below, with more information available in the DAWR publication: 'Factors affecting post-harvest management of apples: a guide to optimising quality', by Robert Nissen, Sally Bound, Rajendra Adhikari and Ian Cover.

Fruit storage

Fruit from the orchard is delivered to the cool store and packhouse in bulk bins, either plastic or wooden. Before the bins are taken from the store to the field they are inspected for cleanliness and cleaned with high pressure water cleaners if required to remove dirt and fruit residues from previous uses.

Fruit that will be stored for medium and long periods is stored under controlled atmosphere (CA) conditions. This means that the oxygen levels in the room are lowered and replaced with inert nitrogen, and the carbon dioxide levels rise slightly, slowing respiration of the fruit. When orders for domestic or export sales are received the apples are removed from storage, graded and packed ready for dispatch.

Removal from storage

Fruit is removed from the storage bins by submersing the bins in water dump tanks and floating the apples out into a water flume. Use of a water system minimises the bruising of fruit. The water in the water dump tank and flume is of a high phytosanitary standard, being drawn from rain water tanks, wells or sometimes town water supplies. Water is often sanitised with an appropriate product to kill and prevent the development of pathogens and spoilage organisms. Sanitisers are automatically dosed into the water by precision equipment. Flume water is often also filtered through sand or mesh filters to remove fine particulate matter. Depending on the throughput of fruit in the packhouse and the amount of dirt associated with the harvest bins, the flume water is either completely replaced once a day, or at least once a week. Any leaves or twigs that were harvested with the apples are mostly removed at this stage. All these procedures ensure that fruit is clean and pest free when it leaves the water dump tanks and proceeds to the grading machinery.

Fruit Washing

Once removed from bins, the apples are washed using rotating brush rollers and food grade detergents to remove field dust and any spray residues. Often warm water is used with detergents or as a rinse to improve the effectiveness of the cleaning process. Following washing, apples are dried by absorbent sponge rollers and/or warm air blown over fruit by high speed fans.

Grading

Apples with visible defects are removed by hand and/or by machines (camera technology) before and/or after the washing processes. Visible defects include fruit with bruises, scratches or marks, fruit that is too small or too large for markets, fruit that has poor colour development, and any damage or infestation/infection from pests or diseases. This rejected fruit is placed onto conveyor belts that carry it to bins for either: selling as second grade fruit on the domestic markets, processing into apple juice or dumping if it is of very low quality. If fruit is dumped it is done at a location and by a method so to ensure that it does not become a source of any pest or disease for nearby apple orchards. Information for different cultivars on market acceptability and defects standards is attached in Appendix 9.3.6 Apple cultivar product specifications.

After cleaning the apples are sorted for colour and size by directing off the conveyor rollers into individual plastic cups on the grading machine. These cups pass under a bank of cameras and the fruit is rotated so that all of the apple's skin can be photographed. This information is used to sort low colour fruit from the normal colour range and improve uniformity of the packed product. While in these individual cups the fruit is weighed and apples within a desired weight range are directed to packing bays to be packed together in trays.

Waxing

Apples usually receive a coating of wax during the cleaning and grading process. Apples naturally develop a coat of wax when they are growing to help protect the fruit and to retain moisture and therefore firmness of the apple. The cleaning process removes some of this natural coat of wax. Often, a food-grade wax is applied to replace the naturally-occurring wax to provide the same benefits, including a glossy shine. The thin layer of replacement wax is applied to the surface of the clean apple by either dipping, brushing or spraying the fruit with the required wax. The resulting layer of wax is almost undetectable to the human eye, and only a very small quantity is used to cover the entire apple. More information on the process and products is available at <http://apal.org.au/apples-and-wax/>.

Packing

Packing is the placement and arrangement of individual fruit onto trays made from cardboard or other materials. These trays protect the fruit from bruising during shipping and distribution. Apples are placed onto the trays by tray filling machines, and the final arrangement is done by hand. During this final arrangement the opportunity exists to further inspect the fruit and reject fruit that does not meet quality requirements.

Once filled, trays of apples are placed into cartons, and lids placed on the cartons. For domestic marketing fruit is often packed into plastic crates. Cartons must be labelled appropriately (including information to allow traceability) and aggregated onto pallets for fork-lift movement into cold stores, refrigerated shipping containers or refrigerated trucks for transport to markets or shipping facilities.

7.5 End-point treatment

It is the importing country that determines whether apple exports require a treatment prior to export or during transportation. Treatments include a range of processes targeted at the control or eradication of pests, including:

- heat or cold treating
- fumigation
- irradiation
- application of any other phytosanitary substances
- any dismantling, repairing, cleaning or deodorising

A range of circumstances govern the criteria for the Australian Quarantine and Inspection Service (AQIS) to require that commodities and or structures are treated. These conditions are linked to the importing country's import conditions or health standards. The importing country will outline the treatment to be carried out on the import permit or the MICO Database.

The Export Control Act 1982 and subordinate legislation, in particular *The Export Control (Plants and Plant Products) Orders 2011*, encompass all horticultural commodities, as well as grain, seed, timber, woodchip, hay and straw etc. This legislation provides overarching principles and outcomes governing the export of plants and plant products from Australia.

Common reasons for end-point treatment

Treatments may need to be applied and verified depend on the situation. For example, pesticide treatment of horticulture crops in field may need to be recorded in certain circumstances to meet an importing country requirement. Treatments applied to consignments generally fall into one of four categories:

- Commercial treatment
- Voluntary treatment
- Mandatory treatment
- Treatment following rejection

Commercial treatment

This is the term used for a treatment that may be applied as a standard industry practice or at the request of the importer and have no bearing on the certification of the goods.

Voluntary treatment

Voluntary treatment is the term used for a treatment that is applied prior to the presentation of the goods for inspection. Voluntary treatments are used as a remedial measure to address the presence, or potential presence of regulated and or prohibited pests and diseases as a precautionary measure, where the status of the goods may not be known.

Mandatory treatment

This is the term used for a treatment that is required by the National Plant Protection Organisation (NPPO) of the importing country, as a condition of entry into that country. Mandatory treatments must be applied to the goods prior to being presented for export inspection and certification unless alternative arrangements have been agreed to between the exporter and AQIS, such as fumigation consistent with *Export Industry Advice Notice G2010/06*. Treatment details must be included on the Phytosanitary Certificate under the treatment section.

Where a treatment is not supervised by an authorised officer, this requirement may be met via written declaration or presentation of a treatment certificate provided by the treating agent certifying the details of the treatment performed. To be satisfied, the authorised officer must be provided with a copy of the treatment certificate clearly identifying that the goods were treated and meet the importing country's requirements.

Treatments following rejection

This may be applied to prescribed goods following the detection of regulated/prohibited items in the goods upon presentation for export certification. All rejected consignments must be segregated to clearly distinguish the produce from goods that remain eligible for export to avoid cross contamination. How the exporter segregates the commodity is at the discretion of the exporter. Please refer to <http://www.agriculture.gov.au/SiteCollectionDocuments/aqis/exporting/plants-exports-operation-manual/Volume-14-Product-Security-Horticulture.doc> for information about product security and maintaining consignments integrity, particularly in relation to the export of horticulture consignments.

Following treatment the exporter must advise the Authorised Officer in writing that the goods are being resubmitted for inspection. Furthermore, the exporter must provide evidence that further processing or treatment has resulted in the produce being suitable for export. This advice may be in the form of a treatment certificate and must indicate the nature of any further preparation, treatment or processing operations that have been undertaken in relation to the produce to render it suitable for export. Any produce that has been treated following rejection must be held under conditions that ensure the security of the goods has been maintained to avoid cross contamination and consistent with conditions as considered necessary by an Authorised Officer.

Types of End-Point Treatments Approved for Apples

Fumigation

Fumigation is the act of releasing and dispersing a toxic chemical so it reaches the target organism in a gaseous state. Chemicals applied as aerosols, smokes, mists, and fogs are suspensions of particulate matter in air and are not fumigants. Commodities vary in their absorption of fumigants and in the effort required to aerate the commodities after fumigation. Some fumigants have no effect on commodities while others are detrimental even at low concentrations.

Some importing countries may specify the dosage and time concentration of fumigants, whilst other importing countries may simply state that fumigation with methyl bromide prior to export is required. In either circumstance, the Authorised Officer must be satisfied that the treatment has been performed and meets the importing country's requirements. If the importing country requires treatment that is inconsistent with the current approved label or state control of use legislation, the Authorised Officer will need to contact the AQIS regional Plant Export office for advice.

Fumigants vary greatly in their mode of action. Some kill rapidly while others kill slowly. In sub lethal dosages, some fumigants may have a paralysing effect on the pest while others will not allow the pest to recover. The toxicity of a fumigant depends on the respiration rate of the target organism. Generally, the lower the temperature, the lower the respiration rate of the organism which tends to make the pest less susceptible. For this reason, fumigation at lower temperatures requires a higher dosage rate for a longer exposure period than fumigation at higher temperatures.

The *AQIS Methyl Bromide Fumigation Standard* provides in depth detail to assist in understanding the fundamental principles of fumigation. An Authorised Officer will need to be able to access this document to monitor fumigations if required and observe OH&S obligations. Note, the instructional material is specific to the plant product being exported, for example instructional material for grain and seeds differs when compared to fresh fruit and vegetables. Fumigations can be carried out in a variety of different chambers, including fixed capacity chambers, flexible tents and within containers. At all times fumigations are to be carried out by licensed fumigators.

Methyl bromide

Methyl bromide is a colourless, odourless, non-flammable fumigant. It is an effective fumigant for treating a wide variety of plant pests associated with a range of commodities. Methyl bromide is the most frequently used fumigant in quarantine fumigations. Methyl bromide may also be used to devitalize plant material.

Methyl bromide is effective in treating the following pests:

- Insects (all life stages)
- Mites and ticks (all life stages)
- Nematodes (including cysts)
- Snails and slugs
- Fungi

Phosphine

Phosphine is used to control insects in grains, seeds, flour, plant products and prepared foods. It is used as a fumigant for seeds as it is not reported to adversely affect the germination of the seeds.

Milled and oily commodities such as flour, soybean meal, fish meal, nuts and oilseeds are often fumigated with phosphine because this treatment is less likely to generate undesirable residues. Phosphine is also often used to treat tobacco, as the process does not result in the formation of any taints.

The use of phosphine as a fumigant is limited by the long exposure time necessary to kill all stages of insects, the resistance of certain insect pests, and poor efficacy at temperatures below 15°C. Phosphine is commonly applied into a grain silo in a gaseous state. Phosphine can be used as a phytosanitary treatment and dosage rates will be applied as per rates prescribed on the label.

Fumigation occupational health and safety

Methyl bromide is a colourless and odourless gas and is among the most hazardous materials used in pest control. Because it is odourless, some countries add low concentrations of chloropicrin (tear gas) as a warning agent, however the use of chloropicrin is no longer standard practice in Australia. Routes of entry to the body include inhalation, skin and ingestion. Symptoms of inhalation appear slowly and include dizziness, blurring of vision, fatigue, slurred speech, nausea, vomiting and possibly coma. Skin contact with liquid methyl bromide or a high concentration of gas can cause severe irritation, including temporary blindness.

Prior to conducting an inspection on fumigated produce, a Gas Clearance Certificate, issued by a licensed fumigator should be sighted. These are normally found on the treatment certificate itself.

Cold Treatment

The use of sustained cold temperatures as a means of insect control has been employed for many years. Rigid adherence to specified temperatures and time periods effectively eliminates certain insect infestations. If a period of cold storage is required as a phytosanitary treatment (e.g. disinfestation for fruit flies) this can be done whilst fruit is in bulk bins in cold storage before the fruit is packed, or after it is packed and is in cartons. The disinfestation involves specific temperature and time management, with verification procedures. Treatments may be conducted in warehouses, or carried out in-transit within refrigerated compartments of transporting vessels, containers cooled by the ship's refrigeration system (Container Vessels), or by individually refrigerated containers.

Pre-cooling procedures

Experience with in-transit cold treatments show that the fruit must be pre-cooled at or below the prescribed cold treatment temperature before loading. Otherwise, a large quantity of fruit in the middle of large pallets may require a week or more to reach the cold treatment temperature.

Fruit intended for in-transit cold treatment should be pre-cooled to the temperature at which the fruit will be treated prior to beginning treatment. Conduct random fruit pulp sampling in the pre-cooling location prior to loading in order to verify that the commodity has completed pre-cooling.

On-shore cold disinfestation

The term 'on shore cold disinfestation' refers to the cold treatment of a commodity within a cold storage unit at an export registered establishment. The course of the treatment will start and finish at the export registered establishment.

In-transit cold disinfestation

The term in 'transit cold disinfestation' refers to the cold treatment of a commodity within a refrigerated unit as it travels to its destination.

Irradiation

Irradiation is the process in which food is exposed to a source of ionising energy to reduce the threat of quarantine pests. The food is placed within a chamber and passes by Cobalt 60 rods, which emit gamma rays.

The result of this type of treatment is:

- Inability of insects to emerge or fly
- Inactivation or devitalisation (seeds may germinate but seedlings do not grow; or tubers, bulbs or cuttings do not sprout)
- Mortality to the pests
- Sterility (inability to reproduce)
- With the ability to sterilise quarantine pests of concern, the Authorised Officer can inspect product after it has been treated and still encounter live pests.

The inspection lot can be passed on the provision that there has been no cross contamination after treatment. The Authorised Officer will therefore need to verify post treatment security of the product to ensure that if they do find live insects on the product, that they have gone through the treatment process.

Monitoring

Dosimetry is the system used by the facility to determine absorbed dose. The absorbed dose is a quantity of radiation energy absorbed per unit of mass of the commodity. This energy is measured in Gray (Gy).

Importing country requirements will outline the minimum absorbed dose (D_{min}) they require for market access. Importing country requirements do not specify the maximum absorbed dose (D_{max}) that is required, though the Food Standards Code has set an upper limit of 1000 Gy. If an Authorise Officer receives a treatment certificate that has a treatment rate greater than 1000 Gy, the product is not fit for human consumption and must be rejected.

The Authorise Officer can determine if the treatment was successful by reviewing the treatment certificate. The certificate will outline the lower limit D_{min} and the upper limit D_{max} . If the range is within the specified limits then the treatment of the commodity was successful.

Note: There are additional requirements for the export of irradiated product to Malaysia and New Zealand. Refer to the importing country requirements and applicable workplan prior to endorsing the export.

Radiation Dose Mapping

Prior to routine treatments, the region(s) of lowest and highest dose absorbance must be mapped for each treatment configuration. Configurations may be defined by a variety of criteria which may vary by facility. Factors that affect dose mapping commonly include:

- Density and composition of the material treated
- Orientation of the product, stacking, volume and packaging
- Shape and/or size

The data obtained from the dose mapping is used to determine the proper number and placement of dosimeters during routine operations. The dosimeters being the device that captures the dosage received on the product from the treatment.

Questions

You can contact your Regional Plant Export Program Manager to clarify any aspects of this volume in the first instance.

You can also direct a specific question or provide feedback to plantexporttraining@daff.gov.au



7.6 Packaging and inspection of goods

Packaging Materials

Materials used to package apples for export must be clean, strong enough to withstand the effects of handling during transit, and used in a manner that is unlikely to place the integrity of the prescribed goods at risk, as outlined in the *Australian Export Control (Plants and Plant Products) Order 2011*. Apple export packaging materials can be designed for either single- or multiple-use, but multiple use materials are not accepted in all export markets and may require additional cleaning, reconditioning and inspection prior to use. Individual importing markets may also require exporters to comply with additional requirements relating to packaging design and/or construction.

Export packaging materials must also permit easy accessibility by authorised inspection officers within Australia and importing countries. For these reasons, packaging materials to be used for export must also be inspected prior to use by authorised inspection officers and authorised by the Department Secretary as suitable for export.

Once fruit packaging is completed, fruit should be returned to cool storage until it is required to be loaded into refrigerated shipping containers for transport. This period of cool storage is usually not long as packing is done in response to export orders being placed.

Inspection of Goods

Fruit being exported to protocol markets requiring export permits and/or phytosanitary certificates require a formal inspection by an Authorised Officer at an export-registered establishment after packing. To arrange an inspection by a DAWR Authorised Officer, submit a *Request for Plant Exports Inspection Appointment* to Plant Export Operations. Inspections by other Authorised Officers, such as third party providers, should be organised with the Authorised Officer. Present your documents to the Authorised Officer before inspection.

Inspections must take place in an export-registered establishment in accordance with the *Export Control (Plants and Plant Products) Order 2011*. Goods may be pre-packed before inspection if the packaging can be removed in a way that allows an Authorised Officer to inspect the goods using a method approved under the *Export Control (Plants and Plant Products) Order 2011*. Alternatively, the goods may be packed after inspection. In packhouses where fruit is also being supplied direct to domestic chain stores a similar formal quality check (QC) is often done on the pallets of packed fruit before it is dispatched. If this is not done at the packing shed then it is usually done on receipt into the chain store's distribution centres (DC).

If a fumigation phytosanitary treatment is required (see 6.5 End-point treatment), this is also applied to the fruit at this stage. Live insects in inspected samples will not be tolerated and infested goods will not be permitted to leave Australia unless specific importing country tolerance levels have not been exceeded. In all instances, it is your responsibility as the exporter to make sure the goods you present for inspection are export compliant.

7.7 Labelling and sealing for transport

Consignment Sealing

All consignments of fruit must be sealed before being loaded and dispatched. Container sealing and Sealing Air freighted cartons must be fruit fly secure before leaving the treatment facility in either sealed cartons, or in vented cartons with mesh or gauze with openings $\leq 1.6\text{mm}$. Transfer certificates are required for consignments to be transported between export establishments. A transfer certificate is required for each consignment in the following situations:

- transportation from PFA regions
- transportation after treatment
- transportation after export inspection.

Sealing for Air Freight

Prior to loading, all packages must be secured in one of two ways; sealing of each individual carton with biosecurity sealing tape prior to loading, or palletisation with shrink wrapping.

When sealing with biosecurity sealing tape, non-palletised cartons must be sealed in the manner shown below (Figure 6) until the consignment arrives in the importing country. Biosecurity sealing tape can be either green tape stating '**RELEASED FROM BIOSECURITY CONTROL**' or yellow tape stating '**PASSED QUARANTINE**' (Figure 7).

When securing cartons using palletisation and shrink wrapping, secured units must be marked as shown below (Figure 8). Air freight consignments secured by palletisation must not be deconsolidated until arrival in the importing country, and the transfer certificate must state this requirement (or require a label stating 'Not to be deconsolidated' on each side of the pallet). Deconsolidation of secured pallets prior to arrival will breach fruit fly freedom and void certification. Due to the difficulties in maintaining security of unit load devices (ULDs), cookie sheets or flat pallets during air freight, cartons shipped using these systems must be treated as individual "packages" and sealed with biosecurity labelling tape as shown in Figure 6.

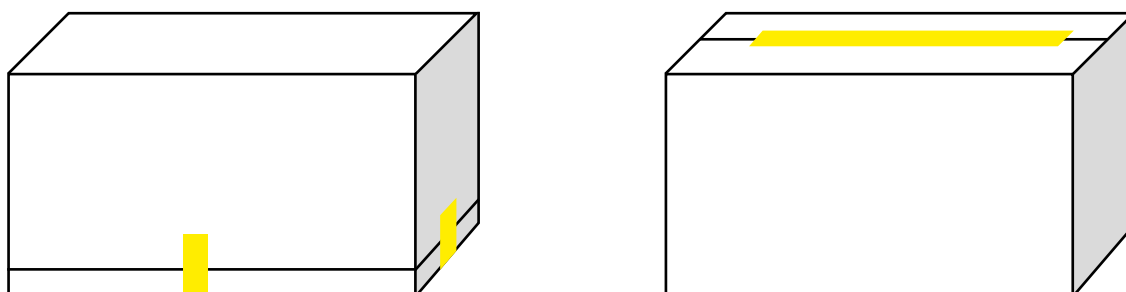


Figure 6. DAWR's approved methods for sealing (a) lidded cartons, and (b) one-piece cartons during fruit export. Yellow markings signify the placement location of biosecurity sealing tape.

**RELEASED FROM
BIOSECURITY
CONTROL**

**PASSED
QUARANTINE**

Figure 7. Biosecurity sealing tape.

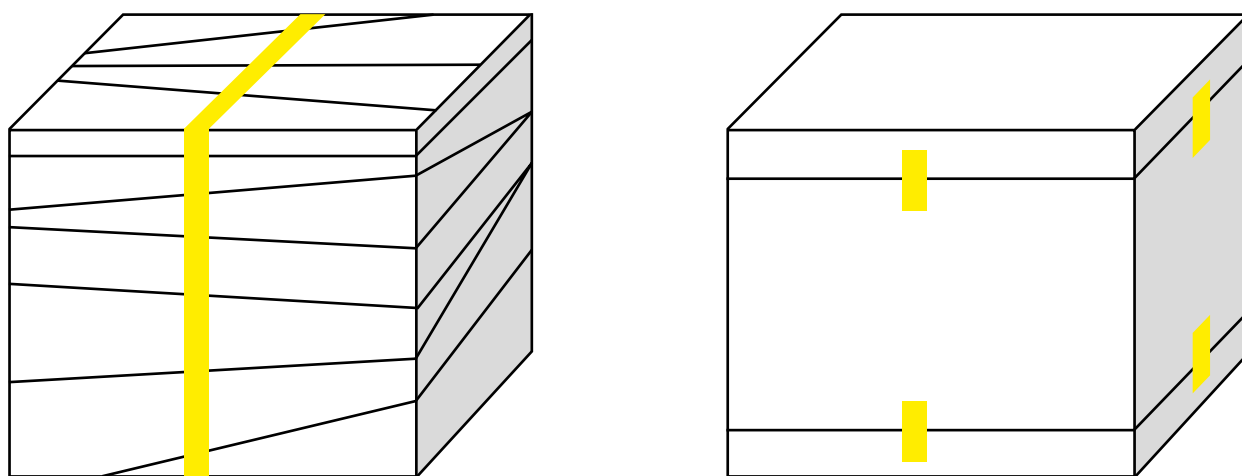


Figure 8. DAWR's approved methods for sealing and denoting (a) shrink-wrapped pallets, and (b) strapped pallets of individually-sealed cartons during fruit export. Yellow markings signify the placement location of biosecurity sealing tape.

Sealing of Sea Freight

An Authorised Officer approved by DAWR must supervise the loading of all sea freight. The container must be inspected by the department before loading to ensure freedom from insect pests and other contaminants. Any vents in this container must be covered with netting or similar materials with openings of $\leq 1.6\text{mm}$ to prevent entry of fruit fly and other insect pests.

Following container loading, an Authorised Officer must supervise loading and placement of a numbered seal on the container. The approved Authorised Officer must record the container and seal number on the phytosanitary certificate, and affix biosecurity labelling tape over the container seal. This tape and seal must only be removed at the port of arrival by a registered officer of the importing nation's quarantine and inspection services. The seal number must also be noted on the calibration certificate if under ITCT.

If the consignment lot is travelling interstate for loading, a transfer certificate is to be used. Full details of the consignment lot will be included on a transfer certificate (EX186) and/or phytosanitary certificate.

Labelling Requirements

The package must have the necessary information to facilitate traceability. At a minimum, all labelling must include the following information:

- 'Produce of Australia'
- Name of exporting company
- Name of fruit (common name)
- Packhouse registration number or Export establishment registration number
- Orchard registration number

In addition to this information, consignments of fruit must include destination labelling for the target market. If the fruit is to be shipped by air-freight, this destination information must appear on each carton within the consignment. For fruit shipped by sea freight, consignments can be palletised and labelled together, with destination labels placed on all sides of the pallet. Examples of destination labelling are described below:

Export Market	Destination Labelling
Chinese PRC	输往中华人民共和国
Japan	日本 or 'FOR JAPAN'
Taiwan	'TO TAIWAN'
Thailand	'EXPORT TO THAILAND'



8: Export Authorisation

8.1 Export permits & trade descriptions

Export Permits

Before you can export prescribed goods from Australia, you must submit a Notice of Intention to Export Prescribed Goods or its electronic equivalent, a *Request for Permit (RFP)*. Forms can be lodged electronically through the EXDOC, or by submitting a hard copy of the form with all supporting documentation to your local DAWR office via email, post or in person.

Notice of intention to export must be given to an Authorised Officer not less than 3 clear working days prior to export (in the case of export by ship) and sufficient time to allow the notice of intention to be certified and export permit granted before the loading of the aircraft (in the case of export by air). Notice of intention to export must be accompanied with an email/fax RFP.

Once the Authorised Officer is satisfied that they meet the requirements of Australian export legislation and the importing country, the officer will sign and stamp the export permit at the bottom of the *Notice of Intention* or authorise the *Request for Export Permit* and send an inspection record to DAWR. The number assigned to the EX28 is the Export Permit and is to be prefixed with PIH when quoting to the Australian Customs Service (ACS) for the Export Declaration Number (EDN)

If you are using an industry Authorised Officer, you must request authorisation of your export permit (see Step 6). If you are using a DAWR Authorised Officer, they will either issue the permit manually on a *Notice of Intention to Export Prescribed Goods* form or electronically through the Export Documentation System EXDOC.

Your goods are export compliant and your export permit is valid for 28 days from the date the export permit is issued. It will be revoked if:

- the goods are not exported within the 28 days
- the goods do not comply with legislative orders
- information in (or relating to) the export permit is incorrect, incomplete or has no sound basis.

If your export permit is revoked, you must surrender it to an Authorised Officer before close of business on the day after the permit is revoked.

Trade Descriptions

The Australian Export Control (Plants and Plant Products) Order 2011 also states that a trade description must accompany exports of apples and other prescribed goods. This trade description must contain adequate information to enable the importing country authority to identify and clear the goods. A trade description applied to goods is adequate to satisfy this legislation if it contains sufficient information to enable the goods to be readily identified, and is not ambiguous or unclear. Without this trade description, the export of those goods is prohibited.

8.2 Phytosanitary certificates

Phytosanitary certificates are official government-to-government certificates certifying that plants and plant products:

- have been inspected according to appropriate procedures; and/or
- have been tested according to appropriate procedures; and/or
- are sourced from particular pest free areas; and/or
- are considered to be free from the quarantine pests or diseases specified by the importing country.

The Phytosanitary Certificate guarantees that Australian plants or plant products have been inspected and tested using appropriate procedures and are considered to be free from quarantine pests and practically free from other injurious pests. Phytosanitary Certificates will be endorsed by DAWR when the exporter provides a signed and stamped copy of the export permit (EX28) as proof of inspection. The number to be assigned to the Phytosanitary Certificate must be the same as the number assigned to the EX28. *The Export Control (Plants and Plant Products) Order 2011* outlines requirements for issuing phytosanitary certificates. Authorised Officers cannot provide certification where an importing country requires endorsements of growing conditions or treatments in the original exporting country.

If your export market requires a phytosanitary certificate, ask your Authorised Officer to provide one when you present your goods for inspection. To confirm whether the importing country requires a phytosanitary certificate, search the Plants database or contact the importing country's National Plant Protection Organisation. Some countries will only accept an electronic phytosanitary certificate. In some circumstances, Australian phytosanitary certificates may be issued for plant product which were not produced in Australia and have previously been imported. The *Phytosanitary Certificate for Re-export* is issued for products that have been formally cleared as imports into Australia. This certificate guarantees that the:

- goods are accompanied by a phytosanitary certificate issued by the country of origin
- goods comply with the requirements of a foreign country authority
- identity of the goods can be established
- consignment has not been exposed to infestation while in Australia.

If imported goods in original packaging are to be re-exported with Australian prescribed goods, they may be certified on an Australian phytosanitary certificate issued for the consignment provided that

- the certificate indicates the country of origin for the imported product; and
- additional declarations required by the importing country authority can be satisfied by product inspection or treatment

8: Export Authorisation

8.3 Other supporting documents

Some importing countries require you to include additional proof of the pest-free status of the produce or other information about the product, such as end-point treatments. You must check whether your goods require supporting documents in order to meet the requirements of the importing country. These requirements may include treatment of the commodity, pest-free area status, or inspection for pests and/or disease during the growing phase. Other certificates that may be required by an importing country include:

- Certificate as to Condition
- Declaration and Certificate as to Condition
- Radioactivity Statement
- Ship's Holds Inspection Certificate.

To show that these requirements have been met you will need documents certified by a person qualified to inspect the goods and make an official declaration. Suitably qualified persons include Department of Primary Industries employees, crop monitors or company employed entomologists. These documents must be presented before the export inspection.



9: References

Hort Innovation 2017, Australian Horticulture Statistics Handbook Fruit 2015/16, Hort Innovation Australia.

Hort Innovation 2017b Apple and Pear Strategic Investment Plan B, Hort Innovation Australia.

WTO 2015 Trade Policy Review, Report by the Secretariat, World Trade Organisation, Geneva.



10: Appendices

10.1 Country-level indicators of socio-economic and business environment for major export destinations

China

Socio-demographic information	China
Population 2017 (million)	1409.5
Population growth rate % (2010-2017 average)	0.5
Economic indicators	
GDP per capita (current US\$)	8123.2
GDP per capita growth (annual %)	6.1
GDP growth (2016)	6.7
Real effective exchange rate index (2010 = 100)	124.3
Production/consumption estimates	
Apple production (FAOSTAT 2016)	44447793
Consumer price index (2010 = 100)	102
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	156
Share in Australia's exports (%)	1.6
Quantity exported in 2016	82
Unit value (USD/unit)	1902
Growth in exported value between 2012–2016 (% , p.a.)	
Growth in exported quantity between 2012–2016 (% , p.a.)	
Ranking of partner countries in world imports	23
Share of partner countries in world imports (%)	1.6
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	15
Business environment in importing country	
Ease of doing business ranking	78
Cost to import, documentary compliance (US\$)	170.9
Lead time to import, median case (days)	5
Competence and quality of logistics services (1=low to 5=high)	3.6
Efficiency of customs clearance process (1=low to 5=high)	3.3
Time to import, border compliance (hours)	92

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Hong Kong

Socio-demographic information	Hong Kong
Population 2017 (million)	7.4
Population growth rate % (2010-2017 average)	0.7
Economic indicators	
GDP per capita (current US\$)	43681.4
GDP per capita growth (annual %)	1.5
GDP growth (2016)	2
Real effective exchange rate index (2010 = 100)	NA
Production/consumption estimates	
Apple production (FAOSTAT 2016)	0
Consumer price index (2010 = 100)	125.9
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	686
Share in Australia's exports (%)	7
Quantity exported in 2016	363
Unit value (USD/unit)	1890
Growth in exported value between 2012–2016 (% , p.a.)	62
Growth in exported quantity between 2012–2016 (% , p.a.)	65
Ranking of partner countries in world imports	18
Share of partner countries in world imports (%)	2.2
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	6
Business environment in importing country	
Ease of doing business ranking	4
Cost to import, documentary compliance (US\$)	57
Lead time to import, median case (days)	3
Competence and quality of logistics services (1=low to 5=high)	4
Efficiency of customs clearance process (1=low to 5=high)	3.9
Time to import, border compliance (hours)	19

(Source: ITC 2017, FAO 2017, UNFPA 2017)

India

Socio-demographic information	India
Population 2017 (million)	1339.2
Population growth rate % (2010-2017 average)	1.2
Economic indicators	
GDP per capita (current US\$)	1339.2
GDP per capita growth (annual %)	1.2
GDP growth (2016)	2
Real effective exchange rate index (2010 = 100)	NA
Production/consumption estimates	
Apple production (FAOSTAT 2016)	2872000
Consumer price index (2010 = 100)	155
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	62
Share in Australia's exports (%)	0.6
Quantity exported in 2016	65
Unit value (USD/unit)	954
Growth in exported value between 2012–2016 (% , p.a.)	-46
Growth in exported quantity between 2012–2016 (% , p.a.)	-13
Ranking of partner countries in world imports	11
Share of partner countries in world imports (%)	3.1
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	4
Business environment in importing country	
Ease of doing business ranking	130
Cost to import, documentary compliance (US\$)	134.8
Lead time to import, median case (days)	5
Competence and quality of logistics services (1=low to 5=high)	3.4
Efficiency of customs clearance process (1=low to 5=high)	3.2
Time to import, border compliance (hours)	283

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Indonesia

Socio-demographic information	Indonesia
Population 2017 (million)	264
Population growth rate % (2010-2017 average)	1.2
Economic indicators	
GDP per capita (current US\$)	3570.3
GDP per capita growth (annual %)	3.8
GDP growth (2016)	5
Real effective exchange rate index (2010 = 100)	NA
Production/consumption estimates	
Apple production (FAOSTAT 2016)	0
Consumer price index (2010 = 100)	137
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	1897
Share in Australia's exports (%)	19.4
Quantity exported in 2016	714
Unit value (USD/unit)	2657
Growth in exported value between 2012–2016 (% , p.a.)	16
Growth in exported quantity between 2012–2016 (% , p.a.)	5
Ranking of partner countries in world imports	8
Share of partner countries in world imports (%)	3.4
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	7
Business environment in importing country	
Ease of doing business ranking	91
Cost to import, documentary compliance (US\$)	164.4
Lead time to import, median case (days)	5
Competence and quality of logistics services (1=low to 5=high)	3
Efficiency of customs clearance process (1=low to 5=high)	2.7
Time to import, border compliance (hours)	99

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Japan

Socio-demographic information	Japan
Population 2017 (million)	127.5
Population growth rate % (2010-2017 average)	-0.1
Economic indicators	
GDP per capita (current US\$)	38900.6
GDP per capita growth (annual %)	1.1
GDP growth (2016)	1
Real effective exchange rate index (2010 = 100)	79.5
Production/consumption estimates	
Apple production (FAOSTAT 2016)	765000
Consumer price index (2010 = 100)	103.5
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	49
Share in Australia's exports (%)	0.5
Quantity exported in 2016	23
Unit value (USD/unit)	2130
Growth in exported value between 2012–2016 (% , p.a.)	
Growth in exported quantity between 2012–2016 (% , p.a.)	
Ranking of partner countries in world imports	98
Share of partner countries in world imports (%)	0.06
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	-10
Business environment in importing country	
Ease of doing business ranking	34
Cost to import, documentary compliance (US\$)	107
Lead time to import, median case (days)	3
Competence and quality of logistics services (1=low to 5=high)	4
Efficiency of customs clearance process (1=low to 5=high)	3.8
Time to import, border compliance (hours)	40

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Korea

Socio-demographic information	Korea
Population 2017 (million)	51
Population growth rate % (2010-2017 average)	0.4
Economic indicators	
GDP per capita (current US\$)	27538.8
GDP per capita growth (annual %)	2.4
GDP growth (2016)	2.8
Real effective exchange rate index (2010 = 100)	144.8
Production/consumption estimates	
Apple production (FAOSTAT 2016)	576369
Consumer price index (2010 = 100)	110.9
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	
Share in Australia's exports (%)	
Quantity exported in 2016	
Unit value (USD/unit)	
Growth in exported value between 2012–2016 (% , p.a.)	
Growth in exported quantity between 2012–2016 (% , p.a.)	
Ranking of partner countries in world imports	198
Share of partner countries in world imports (%)	0
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	41
Business environment in importing country	
Ease of doing business ranking	5
Cost to import, documentary compliance (US\$)	27
Lead time to import, median case (days)	3
Competence and quality of logistics services (1=low to 5=high)	3.7
Efficiency of customs clearance process (1=low to 5=high)	3.5
Time to import, border compliance (hours)	6

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Malaysia

Socio-demographic information	Malaysia
Population 2017 (million)	31.6
Population growth rate % (2010-2017 average)	1.7
Economic indicators	
GDP per capita (current US\$)	9508.2
GDP per capita growth (annual %)	2.7
GDP growth (2016)	4.2
Real effective exchange rate index (2010 = 100)	88
Production/consumption estimates	
Apple production (FAOSTAT 2016)	0
Consumer price index (2010 = 100)	115.2
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	503
Share in Australia's exports (%)	5.2
Quantity exported in 2016	580
Unit value (USD/unit)	867
Growth in exported value between 2012–2016 (% , p.a.)	2
Growth in exported quantity between 2012–2016 (% , p.a.)	11
Ranking of partner countries in world imports	25
Share of partner countries in world imports (%)	1.5
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	16
Business environment in importing country	
Ease of doing business ranking	23
Cost to import, documentary compliance (US\$)	60
Lead time to import, median case (days)	7
Competence and quality of logistics services (1=low to 5=high)	3.3
Efficiency of customs clearance process (1=low to 5=high)	3.2
Time to import, border compliance (hours)	72

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Netherlands

Socio-demographic information	Netherlands
Population 2017 (million)	17
Population growth rate % (2010-2017 average)	0.3
Economic indicators	
GDP per capita (current US\$)	45669.8
GDP per capita growth (annual %)	1.7
GDP growth (2016)	2.2
Real effective exchange rate index (2010 = 100)	97
Production/consumption estimates	
Apple production (FAOSTAT 2016)	317000
Consumer price index (2010 = 100)	109.5
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	252
Share in Australia's exports (%)	2.6
Quantity exported in 2016	113
Unit value (USD/unit)	2230
Growth in exported value between 2012–2016 (% , p.a.)	
Growth in exported quantity between 2012–2016 (% , p.a.)	
Ranking of partner countries in world imports	13
Share of partner countries in world imports (%)	2.8
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	-13
Business environment in importing country	
Ease of doing business ranking	28
Cost to import, documentary compliance (US\$)	0
Lead time to import, median case (days)	2
Competence and quality of logistics services (1=low to 5=high)	4.2
Efficiency of customs clearance process (1=low to 5=high)	4.1
Time to import, border compliance (hours)	0

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Papua New Guinea

Socio-demographic information	PNG
Population 2017 (million)	8.3
Population growth rate % (2010-2017 average)	2.1
Economic indicators	
GDP per capita (current US\$)	2500.1
GDP per capita growth (annual %)	0.3
GDP growth (2016)	2.4
Real effective exchange rate index (2010 = 100)	123.5
Production/consumption estimates	
Apple production (FAOSTAT 2016)	0
Consumer price index (2010 = 100)	NA
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	1569
Share in Australia's exports (%)	16.1
Quantity exported in 2016	1061
Unit value (USD/unit)	1479
Growth in exported value between 2012–2016 (% , p.a.)	-9
Growth in exported quantity between 2012–2016 (% , p.a.)	-7
Ranking of partner countries in world imports	112
Share of partner countries in world imports (%)	0.04
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	-8
Business environment in importing country	
Ease of doing business ranking	119
Cost to import, documentary compliance (US\$)	85
Lead time to import, median case (days)	NA
Competence and quality of logistics services (1=low to 5=high)	2.4
Efficiency of customs clearance process (1=low to 5=high)	2.6
Time to import, border compliance (hours)	72

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Qatar

Socio-demographic information	Qatar
Population 2017 (million)	
Population growth rate % (2010-2017 average)	
Economic indicators	
GDP per capita (current US\$)	59324.3
GDP per capita growth (annual %)	-1.3
GDP growth (2016)	
Real effective exchange rate index (2010 = 100)	NA
Production/consumption estimates	
Apple production (FAOSTAT 2016)	0
Consumer price index (2010 = 100)	115.7
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	39
Share in Australia's exports (%)	0.4
Quantity exported in 2016	11
Unit value (USD/unit)	3545
Growth in exported value between 2012–2016 (% , p.a.)	45
Growth in exported quantity between 2012–2016 (% , p.a.)	38
Ranking of partner countries in world imports	50
Share of partner countries in world imports (%)	0.3
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	7
Business environment in importing country	
Ease of doing business ranking	83
Cost to import, documentary compliance (US\$)	290
Lead time to import, median case (days)	3
Competence and quality of logistics services (1=low to 5=high)	3.5
Efficiency of customs clearance process (1=low to 5=high)	3.6
Time to import, border compliance (hours)	88

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Saudi Arabia

Socio-demographic information	Saudi Arabia
Population 2017 (million)	
Population growth rate % (2010-2017 average)	
Economic indicators	
GDP per capita (current US\$)	20028.6
GDP per capita growth (annual %)	-0.5
GDP growth (2016)	
Real effective exchange rate index (2010 = 100)	123.2
Production/consumption estimates	
Apple production (FAOSTAT 2016)	0
Consumer price index (2010 = 100)	122.4
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	3
Share in Australia's exports (%)	0
Quantity exported in 2016	1
Unit value (USD/unit)	3000
Growth in exported value between 2012–2016 (% , p.a.)	
Growth in exported quantity between 2012–2016 (% , p.a.)	
Ranking of partner countries in world imports	16
Share of partner countries in world imports (%)	2.5
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	1
Business environment in importing country	
Ease of doing business ranking	94
Cost to import, documentary compliance (US\$)	390
Lead time to import, median case (days)	7
Competence and quality of logistics services (1=low to 5=high)	3
Efficiency of customs clearance process (1=low to 5=high)	2.7
Time to import, border compliance (hours)	228

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Singapore

Socio-demographic information	Singapore
Population 2017 (million)	5.7
Population growth rate % (2010-2017 average)	1.7
Economic indicators	
GDP per capita (current US\$)	52962.5
GDP per capita growth (annual %)	0.7
GDP growth (2016)	1.99
Real effective exchange rate index (2010 = 100)	109.5
Production/consumption estimates	
Apple production (FAOSTAT 2016)	0
Consumer price index (2010 = 100)	112.6
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	166
Share in Australia's exports (%)	1.7
Quantity exported in 2016	158
Unit value (USD/unit)	1051
Growth in exported value between 2012–2016 (% , p.a.)	41
Growth in exported quantity between 2012–2016 (% , p.a.)	37
Ranking of partner countries in world imports	29
Share of partner countries in world imports (%)	0.9
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	1
Business environment in importing country	
Ease of doing business ranking	2
Cost to import, documentary compliance (US\$)	40
Lead time to import, median case (days)	2
Competence and quality of logistics services (1=low to 5=high)	4.1
Efficiency of customs clearance process (1=low to 5=high)	4.2
Time to import, border compliance (hours)	35

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Sri Lanka

Socio-demographic information	Sri Lanka
Population 2017 (million)	20.9
Population growth rate % (2010-2017 average)	0.5
Economic indicators	
GDP per capita (current US\$)	3835.4
GDP per capita growth (annual %)	3.2
GDP growth (2016)	4.4
Real effective exchange rate index (2010 = 100)	NA
Production/consumption estimates	
Apple production (FAOSTAT 2016)	0
Consumer price index (2010 = 100)	134.1
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	86
Share in Australia's exports (%)	0.9
Quantity exported in 2016	108
Unit value (USD/unit)	796
Growth in exported value between 2012–2016 (% , p.a.)	4
Growth in exported quantity between 2012–2016 (% , p.a.)	46
Ranking of partner countries in world imports	53
Share of partner countries in world imports (%)	0.3
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	11
Business environment in importing country	
Ease of doing business ranking	110
Cost to import, documentary compliance (US\$)	283
Lead time to import, median case (days)	2
Competence and quality of logistics services (1=low to 5=high)	NA
Efficiency of customs clearance process (1=low to 5=high)	NA
Time to import, border compliance (hours)	72

(Source: ITC 2017, FAO 2017, UNFPA 2017)

Thailand

Socio-demographic information	Thailand
Population 2017 (million)	69
Population growth rate % (2010-2017 average)	0.4
Economic indicators	
GDP per capita (current US\$)	69
GDP per capita growth (annual %)	0.4
GDP growth (2016)	1.99
Real effective exchange rate index (2010 = 100)	109.5
Production/consumption estimates	
Apple production (FAOSTAT 2016)	0
Consumer price index (2010 = 100)	110.6
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	404
Share in Australia's exports (%)	4.1
Quantity exported in 2016	253
Unit value (USD/unit)	1597
Growth in exported value between 2012–2016 (% , p.a.)	-11
Growth in exported quantity between 2012–2016 (% , p.a.)	-6
Ranking of partner countries in world imports	10
Share of partner countries in world imports (%)	3.1
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	11
Business environment in importing country	
Ease of doing business ranking	46
Cost to import, documentary compliance (US\$)	43
Lead time to import, median case (days)	1
Competence and quality of logistics services (1=low to 5=high)	3.1
Efficiency of customs clearance process (1=low to 5=high)	3.1
Time to import, border compliance (hours)	50

(Source: ITC 2017, FAO 2017, UNFPA 2017)

United Arab Emirates

Socio-demographic information	UAE
Population 2017 (million)	66.2
Population growth rate % (2010-2017 average)	0.6
Economic indicators	
GDP per capita (current US\$)	37622.2
GDP per capita growth (annual %)	1.8
GDP growth (2016)	1.8
Real effective exchange rate index (2010 = 100)	NA
Production/consumption estimates	
Apple production (FAOSTAT 2016)	0
Consumer price index (2010 = 100)	111.1
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	1094
Share in Australia's exports (%)	11.2
Quantity exported in 2016	428
Unit value (USD/unit)	2556
Growth in exported value between 2012–2016 (% , p.a.)	187
Growth in exported quantity between 2012–2016 (% , p.a.)	122
Ranking of partner countries in world imports	14
Share of partner countries in world imports (%)	2.7
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	1
Business environment in importing country	
Ease of doing business ranking	26
Cost to import, documentary compliance (US\$)	283
Lead time to import, median case (days)	2
Competence and quality of logistics services (1=low to 5=high)	3.8
Efficiency of customs clearance process (1=low to 5=high)	3.8
Time to import, border compliance (hours)	54

(Source: ITC 2017, FAO 2017, UNFPA 2017)

United Kingdom

Socio-demographic information	United Kingdom
Population 2017 (million)	66.2
Population growth rate % (2010-2017 average)	0.6
Economic indicators	
GDP per capita (current US\$)	40341.4
GDP per capita growth (annual %)	1
GDP growth (2016)	1.8
Real effective exchange rate index (2010 = 100)	109.7
Production/consumption estimates	
Apple production (FAOSTAT 2016)	481100
Consumer price index (2010 = 100)	112.6
Export statistics (From Australia)	
Value exported in 2016 (USD thousand)	2545
Share in Australia's exports (%)	26.1
Quantity exported in 2016	1578
Unit value (USD/unit)	1613
Growth in exported value between 2012–2016 (% , p.a.)	21
Growth in exported quantity between 2012–2016 (% , p.a.)	31
Ranking of partner countries in world imports	2
Share of partner countries in world imports (%)	5.7
Total imports growth in value of partner countries between 2012–2016 (% , p.a.)	-6
Business environment in importing country	
Ease of doing business ranking	7
Cost to import, documentary compliance (US\$)	0
Lead time to import, median case (days)	3
Competence and quality of logistics services (1=low to 5=high)	4
Efficiency of customs clearance process (1=low to 5=high)	4
Time to import, border compliance (hours)	3

(Source: ITC 2017, FAO 2017, UNFPA 2017)

10.2 Example Export Registration Documents

10.2.1 Export Registration Application

The following example documents have been reproduced with permission by the Department of Agriculture and Water Resources. Current applications are available from <http://www.agriculture.gov.au/SiteCollectionDocuments/export/horticulture-exports-program-application-export-approval-tas-apple-pear.docx>

Privacy Notice - Horticulture Exports Program

Personal information means information or an opinion about an identified individual, or an individual who is reasonably identifiable.

The Department of Agriculture and Water Resources (the department) collects your personal information, as defined by the *Privacy Act 1988* (Privacy Act), in relation to this application the purpose of export listing, meeting requirements under nominated importing country protocols, to assist in the collection of industry levies, and related purposes. If you fail to provide some or all of the personal information requested in this application, the department will be unable to assess your eligibility to export your commodity to importing countries.

The department may disclose your personal information to Australian Diplomatic Posts, and relevant Industry Peak Bodies, and other Australian government agencies, persons or organisations where necessary for the above purposes, provided the disclosure is consistent with relevant laws, in particular the Privacy Act. Your personal information will be used and stored in accordance with the Australian Privacy Principles.

By completing and submitting this form you consent to the disclosure of all personal information contained in this form to National Plant Protection Organisation (NPPO) of the nominated importing countries. The department has not taken steps to ensure that the NPPO of importing countries does not breach the Australian Privacy Principles. This means that:

- The NPPO will not be accountable under the Privacy Act
- You will not be able to seek redress under the Privacy Act
- You may not be able to seek redress in the overseas jurisdiction
- NPPO of importing countries may not be subject to any privacy obligations or to any principles similar to the Australian Privacy Principles.

See the department's Privacy Policy to learn more about accessing or correcting personal information or making a complaint. Alternatively, telephone the department on +61 2 6272 3933 to contact the privacy team.



**Export Application for Orchard, Packhouse, Cold Store and Fumigation
 Facility for Apples to China, Japan, Taiwan and Thailand and
 Pears to Thailand – 2017 to 2018 Season**
 (only one application per form)

Orchard/Packhouse/Facility Name		Registration Number (if known)	
Application for (select one only)	Orchard <input type="checkbox"/>	Packhouse <input type="checkbox"/>	Cold Store <input type="checkbox"/> Treatment Facility <input type="checkbox"/>
Markets for Export	Apples China <input type="checkbox"/> Taiwan <input type="checkbox"/> Japan <input type="checkbox"/> Thailand <input type="checkbox"/>		Pears Thailand <input type="checkbox"/>
Orchard/Packhouse/Facility Representative	Name:		
	E-mail Address:		
	Phone:		Mobile:
Physical Address	Address:		State:
	Region:		Postcode:
Postal Address (if different to above)	Address:		State:
	Region:		Postcode:
Registered Crop Monitor(s) – Orchard Applications Only:			
Nominated Packhouse(s) – Orchard Applications Only:			
Declaration: By applying for protocol export approval, I/we agree to the following: <ul style="list-style-type: none"> • To meet the conditions and requirements that apply to the export of Australian fruit to the nominated protocol market(s). • To undertake regular and routine management, to ensure that quarantine pests of concern to protocol markets are adequately managed. • The Department of Agriculture and Water Resources Privacy Notice (attached). <p><i>Failure to comply with the aforementioned conditions and restrictions, including, but not limited to providing access to properties and documents required under the above agreements, may lead to importing country requirements not being met or not being verified which will prevent certification being issued.</i></p>			
Submission(s): Fruit Growers Tasmania Inc. <ul style="list-style-type: none"> • email ian@fruitgrowerstas.org.au • phone 03 6169 2059 • fax 03 6231 1929. 			

By signing this registration application, I acknowledge I have read the relevant Protocols and Work Plans (as applicable) for the nominated markets and agree to meet the conditions and requirements contained therein.

Orchard/Packhouse/Facility Representative (print name):	Signature:	Date:
Witness (print name):	Signature:	Date:

Export Apple and Pear Orchard Block Details Form

Orchard Name:					Office Use Only				
Block Location (physical address)	Block Identifier (as labelled on map)	Area (Ha – 1 Decimal Place) e.g. 4.1 Ha	Apple or Pear?	Export Destination(s) – Please Tick				Export Registration Block Number	Biosecurity Tasmania Trapping
				China	Japan	Taiwan	Thailand		
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									

Block/Map Details:

It is mandatory that a map of the property be provided with block details. It is a requirement that the grower be able to identify exactly the physical location of the export listed orchard. The grower must be able to clearly distinguish the block(s) identified for export listing. There must be a detailed map of the orchard with clear delineation of the registered block(s), both on the map provided and on-site. Maps provided must include key information (i.e. road names) to identify the property through a searchable computer-based mapping program (e.g. Google maps).



Plant Export Operations Registered Establishment Audit Report

Registered Establishment (RE) Information	
RE name: Apple Exporter Pty Ltd (example)	RE no.: XXXX
Audit date: DD/MM/YYYY	Audit no. (RE no. – YY##): XXXX – E.g. 1701
Audit type:	<input checked="" type="checkbox"/> Periodic <input type="checkbox"/> Unannounced
Establishment type: Pack house	
Stakeholder participants: Mr. Smith (registered contact)	

Activities Summary					
Activity	Score	Category (critical, major, minor)	Corrective Action Request (CAR) no. (RE no. – YY## – ##)		Deadline for rectification
1. Record Keeping	1-10	Major	–	–	
2. Plans & Specifications	1-10	Minor	–	–	
3. Hygiene	1-10	Critical <input type="checkbox"/>	–	–	
4. Pest Control	1-10	Critical	–	–	
5. Structural Requirements	1-10	Major	–	–	

Audit Results			
Overall audit score:	XX	%	
Immediate action:	<input type="checkbox"/> CARs to be addressed	<input type="checkbox"/> Fail – Referred to Delegate	<input type="checkbox"/> Critical activity fail – Referred to Delegate
Next audit timeframe:	<input checked="" type="checkbox"/> Twelve months	<input type="checkbox"/> Six months	<input type="checkbox"/> Three months

Audit Observations and Comments
A brief description of audit results with respect to the activities listed above.

Auditor(s) name: DAWR Auditor	Date: DD/MM/YYYY
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Australian Government
**Department of Agriculture
and Water Resources**

13th November 2017

Fruit Growers Tas
Apple Exporter
262 Argyle Street
Hobart TAS 7000

Dear Exporter,

Re: Result of the Department of Agriculture and Water Resources audit for Australian Apple and Pear exports to China, Japan, Taiwan and Thailand.

Thank you for your application to export during the 2017-18 Apple and Pear export season. As a result of the audit, your application has been found compliant with the China, Japan, Taiwan and Thailand Apple export protocols.

Your packhouse has passed audit and is now registered to pack apples for export to the China and Thailand under the following number: **XXXX**

Your coolstore has passed audit and is now registered to pack apples for export to the China and Thailand under the following number: **XXXX**

Your orchard has passed audit and is now registered for export to China and Thailand under the following numbers:

Approved Lots	Approval Number	Country Not Applied
Block A	HBA2003-01	Taiwan and Japan
Block B	HBA2003-02	Japan
Block C	HBA2003-03	Taiwan

Please read relevant work plans and protocols, which detail how these approval numbers are to be used on packaging and phytosanitary certificates.

Please note the department may be conducting unannounced follow-up audits during the export season to ensure compliance with the importing country requirements.

I wish you well for the export season.

Yours sincerely,

Signed
Audit Services Group

10.2.2 Australian apple exporters listings

AFPC Exports

AFPC Exports (part of the N&A Group) provides premium Australian apples and pears to destinations around the world from all major Australian ports. Founded in 1982, AFPC Exports was one of the first companies in Australia to provide import and export services for fresh fruits and vegetables.

In 2006, AFPC Exports became part of the N&A Group, a company with over 60 years' experience in growing and distributing premium apples and pears from a well-established and exclusive network of Australia's top growers.

Today, AFPC Exports operates out of the Sydney Markets and is conveniently located to Sydney International Airport and Sydney Harbour. AFPC Exports is available 24 hours per day, seven days per week to fulfil orders and provides a high level of customer service.

From the Pacific and South East Asia, to the Middle East, Europe and beyond, AFPC Exports provides Australia's highest quality apples and pears to businesses spanning the globe. Their long-established relationships with freight providers, allows them to ensure reliable and cost effective transport solutions, maintaining quality of the product for a timely delivery.

AFPC Exports can adapt to customers' needs with ease and flexibility and is committed to providing customers with every request, 100 percent of the time.

www.afpc.com.au

For Export

Apples: Fuji, Golden Delicious, Greenstar®, Granny Smith, Joya®, Kanzi®, PinkLady®, Red Delicious, Royal Gala.

Pears: Beurré Bosc, Corella, Nashi, Packham, Paradise, Williams.

Contact

Geoff Hagarty
General Manager
T: (+61 2 9764 3499
F: (+61) 2 9746 7633
M: (+61) 413 512 251
E: sales@afpc.com.au

Berraworth Exports Pty Ltd

Over 780 acres of pome fruit orchard supply Berraworth Exports / GV Independent Packers. The orchards area family run business with a great team behind them that takes the greatest care in producing the highest quality fruit.

The orchards are highly focused on Integrated Pest Management, which is an effective and environmentally sensitive approach to pest management that has the least possible negative impact on people, property and the environment. GV Independent Packers use pheromones to minimise chemical spraying and natural pollination in all their orchards.

GV Independent Packers supplies a huge range of different apples and pears under its own 'Sun Pick' brand in many different packaging styles including fully wrapped, loose, punnets and flow wrapped.

GV Independent Packers supplies all year round due to seasonal availability and they take pride in growing, packing and supplying with 100 per cent care from tree to customer. GV Independent Packers is certified in food safety and hygiene management under Global Gap, HACCP & Fresh Care.

www.berraworthexports.com.au

For Export

Apples: Granny Smith, PinkLady®, Royal Gala.

Pears: Beurré Bosc, Josephine, Packham, Williams.

Contact

Chris Georgopoulos
Director
M: (+61) 407 517 964
E: info@berraworthexports.com.au

Bonny Glen Fruits Pty Ltd

Bonny Glen is a second generation family-run business, managed by brothers Tim and Bernard Hall. With 150,000 apple trees across three orchards, Bonny Glen is located in Orange, NSW. Orange is located at high altitude in rich volcanic soil, nourished by fresh, clean mountain water. Warm sunny days and cool clear nights provide ideal growing conditions for crisp crunchy apples.

Bonny Glen's facilities include seven controlled atmosphere rooms, a Smart Fresh room (a new technology to seal in the crispness of apples after harvest) and a separate pack house for apples and cherries, enabling them to grade, pack and market their own apples. The pack house has recently been renovated and extended.

The apple pack house has stringent quality control methods, to ensure only superior fruit is packed and exported. It incorporates the latest technology in software for camera colour sorting and operates for 10 months of the year.

www.biteriot.com.au

BW Griggs & Sons

BW Griggs & Sons is a family business of sixth generation Tasmanian apple growers who grow all the mainstream varieties of apples. Most recently they discovered and have developed the new Rubigold® apple variety for which they have secured the plant breeding rights, trademark protection and international distribution rights.

Rubigold® has a multi-dimensional flavour profile with more to it than the simple sweetness of a Gala or Fuji apple. It's a large apple with an 80-90 percent deep red colour, lime green background and golden flesh.

BW Griggs & Sons is a medium-sized business located in the Huon Valley in Tasmania, which provides ideal growing conditions for apples. Their facilities include cool storage, and apple sorting and packing facilities, and they operate as growers, packers and exporters.

In 2015, they were the largest exporter of Australian apples into China, which comprised of 90 per cent Rubigold® apples. In that year they also won the Exporter of the Year Award as part of the National Awards for Excellence for the Australian apple and pear industry.

www.rubigold.com.au

For Export

Apples: PinkLady®, Royal Gala.

Contact

Benard Hall

Director

M: (+61) 409 012 680

E: thecherryking@bigpond.com.au



For Export

Apples: Rubigold®.

Contact

Dane Griggs

Partner

M: (+61) 417 642 766

E: info@bwgriggs.com.au

Glenburn Orchards

Glenburn Orchards originated in 1857 and was the first property settled in Cygnet, Tasmania. Their close proximity to Cygnet Bay provides a micro-climate, ideal for growing fruit.

Glenburn's heritage is deeply embedded in the Harvey family, with six generations working the land to grow and produce premium apples and cherries. The inspiration for Glenburn has been John Harvey and son, Richard Harvey (both deceased), who brought Glenburn to where it is today.

James and Adam are the sixth generation in the farming business. Together with their mother Maree they draw on their strengths in developing a good business culture to take the business forward.

Glenburn has their own packing sheds, which means they can harvest and despatch according to market demands. The business strives to meet the strict quality controls required by the Australian and overseas markets, integrating these requirements into their work practices.

Their cool rooms and controlled atmosphere storage systems are located on their premises and use the latest technology, such as Smart Fresh®, to maintain extra crunch and quality in their apples. They are guided by experts within the industry and work closely with both domestic and overseas distribution channels.

www.glenburnorchards.com.au

For Export

Apples: Alvina Gala, PinkLady®.

Contact

Chris Chen
Business Development Manager
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E: christwpg@gmail.com

Maree Harvey
Business Owner
M: (+61) 437 924 190

Hansen Orchards Pty Ltd

Hansen Orchards is a fourth generation family-owned business growing, packing and marketing over 200 hectares of apples and cherries.

They are located in the pristine environment of the Huon Valley in southern Tasmania, Australia.

Tasmania has a rich history in the apple industry, so much so that it is commonly known throughout the world as the 'Apple Isle'. The temperate to cool maritime climate of Tasmania allows Hansen Orchards to grow firm, highly coloured, sweet apples with a long shelf life.

Hansen Orchards have invested in new varieties and new strains of existing varieties and coupled this with the world's best growing practices. In 2016, Hansen Orchards won the Exporter of the Year for the apple and pear industry's National Awards for Excellence.

Together with their brand new state-of-the-art packing facility situated on their farm, they have capitalised on their unique growing environment to provide their customers with what they say are the best red apples in the world.

www.hansenorchards.com.au



For Export

Apples: Red Fuji, Pink Lady®, Royal Gala, Tasmanian Tiger Fuji™.

Contact

Baden Ribbon
Marketing Manager
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E: baden@hansenorchards.com.au

Jeftomson

Geoffrey Thompson Fruit Packing Company Pty Ltd was founded in 1949 by Mr Geoffrey Thompson Senior and four other fruit-growing families in Shepparton, the largest apple and pear growing district in Australia.

The business began supplying apples and pears to the United Kingdom and Europe, and then progressed to supplying South East Asia under the Jeftomson brand, which is recognised worldwide as a supplier of quality Australian apples and pears.

The company is a vertically integrated horticultural business, having full control of the product from growing, storing, packing and transport, through to sales and marketing. It has the largest apple and pear packing business in Australia.

In excess of 35,000 tonnes of fruit was processed by Jeftomson in 2013, which is forecast to increase to more than 40,000 tonnes by 2019. They are the largest Australian pear supplier to New Zealand.

Fruit is primarily sourced from the growing districts of Shepparton, Harcourt and Cobram in Victoria, with key packing partners in other main districts. The company's own orchards supply 90 per cent of the current fruit intake for the pack house. Trading relationships with over 50 external growers supply the remaining 10 percent.



For Export

Apples: Fuji, Granny Smith, Joya®, PinkLady®, Royal Gala.

Pears: Corella, Packham.

Contact

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Export Manager
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M: (+61) 418 575 919
E: tnethersole@jeftomson.com

Lee McKeand Produce Pty Ltd

Lee McKeand Produce Pty Ltd is one of Australia's oldest agribusiness companies, established in the 1930s.

Today they are one of Australia's most diversified and progressive shippers of fresh fruits and vegetables to the world.

They are proud of their history and experience, but these days their reputation is more defined by their quality produce and attention to detail. Their team's extensive product and market knowledge allows them to provide an exceptional level of service to their customers in more than 30 countries around the world.

Their product range shipped under Sunflower, Full Moon and Gloria brands include – apples, pears, oranges, mandarins, grapes, cherries, nectarines, plums, peaches, onions and carrots.

Lee McKeand Produce is supplied from farms within the Lee McKeand group and from their supply partners, with whom they have developed long standing relationships.

www.mckeandproduce.com.au



For Export

Apples: Granny Smith, PinkLady®.

Pears: Beurré Bosc, Corella, Packham, Paradise, William.

Contact

David White
Director
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Lenswood Cold Stores Co-operative Society Ltd

In 1933 Lenswood Cold Stores Co-operative Society was established. Its first packing shed was constructed in 1939 and the business expanded from storing into packing and marketing apples.

Today, Lenswood grows and packs 20,000 tonnes of fruit annually, accounting for nearly 10 per cent of Australia's national production. The scale of Lenswood's operation is increasing as they innovate and expand in select regions of Australia.

Lenswood's culture to learn and strive to be the best traces back to the 1900s with growers seeking advances to help them become better orchardists. The search for knowledge and innovation remains to this day with the continued commitment to create excitement in the apple industry by offering a range of new varieties. Lenswood has recently invested another \$5M in upgrading and commissioning new packing equipment targeting export markets.

Lenswood has actively expanded its export capability and currently exports to the United Kingdom, Thailand, Malaysia and Singapore and in 2015 was the largest exporter of fresh apples from Australia.

Lenswood has also purchased the Intellectual Property rights to several new varieties of apples and is working with international partners in the northern hemisphere and South East Asia to create and expand its export program.

www.lenswoodcoop.com.au

SINCE 1933
Lenswood
APPLES

For Export

Apples: Fuji, Granny Smith, Joya®, MiApple™, PinkLady®, Rockit™, Red Delicious.

Contact

Conrad Guerra
Chief Executive Officer
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E: conrad@lenswoodcoop.com.au

Montague

Montague is Australia's leading procurer and distributor of quality pome (apple and pear) and stone fruit and a key supplier to major retailers in Australia and overseas. Montague has a proud 60-year history and is still a wholly family owned company.

Montague has been growing apples in Australia since the 1960s. Their orchards are located in the prime growing regions of Australia in Batlow (New South Wales), Harcourt (Victoria), Legana (Tasmania) and Narre Warren North (Victoria) where they grow Australia's most loved varieties.

They believe in delivering the best tasting fruit to customers. Montague is the sole Australian licence holder for exclusive apple varieties including Jazz™, Envy™, Eve™ and Smitten®.

Together, Montague Orchards and Montague Fresh are a true 'Field to Fork' company, overseeing the entire supply chain.

Montague has a long history of exporting fruit throughout Asia, the Middle East and Europe. They also won the 2016 Marketer of the Year award as part of the apple and pear industry's National Awards for Excellence.

www.glenburnorchards.com.au

Since 1948
MONTAGUE

For Export

Apples: Gala, Granny Smith, PinkLady®, Red Delicious.

Contact

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Manager
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Alvin Zhang
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N&A Group

N&A Group is a grower led, vertically integrated business specialising in growing, packing, distributing and exporting premium Australian fresh produce. Owned and operated by the Cathels family since 1956, the N&A Group has origins in the late nineteenth century, and is now one of the leading growers and distributors of tree fruit throughout Australia.

N&A Group's exclusive network of Australia's top apple and pear growers, developed and strengthened over 60 years of trade, provides their customers with year-round access to Australia's highest quality apples and pears.

Their extensive cold storage, ripening and packing facilities are conveniently located in the Sydney Markets, and in close proximity to Sydney International Airport and Sydney Harbour.

With over 30 years' experience exporting Australian fresh produce to the world, N&A Group's export division – AFPC Exports, draws on the Group's access to quality Australian growers and its long standing relationships with freight providers to deliver their customers Australian apples and pears of the highest quality in a timely, reliable and cost efficient manner.

www.nagroup.com.au

Newton Orchards

A family owned and operated business for more than 87 years, Newton Orchards of Manjimup has grown to become one of the most progressive and respected pome fruit producers in Australia.

Four properties located around the Southern Forests region comprise one of Western Australia's largest orchards for both organic and non-organic fruit. Manjimup is recognised in both domestic and international markets as one of the pre-eminent areas across the globe for premium pome fruit production.

Newton Orchards also store, pack and market for several small-to medium-sized growers in the region.

The team takes pride in going above and beyond their customers' required standards to grow safe, high quality fruit with integrity. Their accreditations include Global Gap, SQF V7.2, Tesco Nurture Silver Status and Australian Certified Organics.

A state-of-the-art MAF pre-sizer compliments speed bagging and punnet flowwrapping lines, giving Newton Orchards the flexibility to efficiently pack large volumes of fruit according to size, colour and quality or grades specific to each customer.

Extensive controlled atmosphere storage facilities mean suitable varieties can be available almost year-round; there is a premium Newton Orchard's apple on the market 12 months of the year.

www.valleyvieworganics.com.au

For Export

Apples: Fuji, Golden Delicious, Granny Smith, Greenstar™, Joya®, Kanzi™, Pink Lady®, Red Delicious.

Pears: Beurré Bosc, Corella, Nashi, Packham, Paradise, Williams.

Contact

Rob Cathels
Managing Director
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M: +61 418 265 690

Newton Orchards of Manjimup

For Export

Apples: Bravo™ (from 2018), Fuji, Granny Smith, Greenstar®, Joya®, Kanzi®, Pink Lady®, Royal Gala.

Pears: Beurré Bosc, Goldrush, Packham, Williams.

Contact

Paul Good
Export & Finance Manager
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9mile Fresh

The 9mile Fresh orchards are located in Southern Victoria taking advantage of a suitable climate and rich soils to produce premium apples.

9mile has over 600 acres of high density apple orchards and carefully chooses other growers to take advantage of the best growing regions in Australia for each different variety of apple. These farms' strategic locations are the key to raising fruit with superior crunch, sweetness and cosmetic appeal.

9mile's new trellised orchards have 2,500-3,300 trees per hectare all grown on dwarf rootstock and have advanced irrigation systems with the focus on efficient water use. All orchards are covered entirely by netting to protect fruit quality and modify the climate.

Modern practices and technology used at 9mile including pruning, thinning and picking platforms, and new techniques such as two-dimensional trellis system, branch tying down and summer branch snapping produce fruit of the highest quality with a great eating experience.

After harvest apples are packed in the most advanced hi-tech facility in the Southern Hemisphere, utilising bruise-free water channels, state-of-the-art packing lines and internal and external optical scanners to ensure each apple we grow, sort and pack reaches the highest of standards.

www.9mile.com.au

For Export

Apples: Granny Smith, PinkLady®, Red Delicious,

Contact

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Director
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E: jr@9mile.com.au

Robert Thomson
Director
M: +61 427 870 723
E: rthompson@9mile.com.au

Plunkett Orchards

Plunkett Orchards (F.J.Lenne Pty Ltd) is a fast-growing family business that has evolved over four generations, specialising in growing, packing and exporting world-class Australian fresh fruit.

The business consists of four orchards, a state-of-the art fruit packaging facility, extensive store rooms and a logistics arm delivering fruit across Australia and around the world.

Over the past decade, Plunkett Orchards has increased from its original size of 60 hectares to 230 hectares and produces an array of quality fruit specialising in apples and pears

Plunkett Orchards is located in Ardmona, in the heart of Australia's Goulburn Valley, about two hours north of Melbourne – renowned as one of the great fruit-growing areas of the world.

They are also investing in growing and developing new types of both apples and pears.

www.plunkettorchards.com.au



For Export

Apples: Fuji, Gala, Granny Smith, Joya®, Pink Lady®, Red Delicious.

Pears: Beurré Bosc, Corella, Josephine, Packham, Red Sensation, Williams.

Contact

Andrew Plunkett
General Manager
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F: (+61) 3 5829 0324
E: andrew@plunkettorchards.com.au

Radevski Coolstores

Radevski Coolstores is a fourth generation owned and operated family business which has been involved in the Apple and Pear industry since 1959 and have over 30 years of experience in the export industry.

A vertically integrated business, controlling the product from growing, storing, packing and marketing, has been the driving force behind delivering premium quality produce.

In 2005, a new state-of-the-art cool store and fruit packing facility was built to handle increased tonnage and recently another 3500m² was added to its facility to house further technology in fruit packing equipment.

Today, they continue to strive forward to develop strong relationships with domestic and international buyers and welcome all enquiries.

www.radevskicoolstores.com.au



For Export

Apples: Gala, Granny Smith, PinkLady®.

Pears: Beurré Bosc, Corella, Josephine, Packham, Williams.

Contact

Johnny Radevski

Export Manager

M: (+61) 413 088 575

E: johnny@radevskicoolstores.com.au

Red Rich Fruits

Red Rich Fruits (M V Napoleone & Co Pty Ltd) commenced operation in 1948 when the late Michael Napoleone purchased his first property and planted apples. Still owned and operated by the Napoleone family, it has since grown to be one of Australia's leading growers, packers and marketers of fresh fruit.

The business now comprises over 300 hectares of orchards in the Yarra Valley, Victoria; state-of-the-art fruit packing facilities, and over 3,500 square metres of cool storage and ripening facilities. Through vertical integration with key partners across Australia, Red Rich now also grow, pack and market a range of premium quality pome fruit, stone fruit, citrus, berries and mangoes.

With more than 50 permanent staff and over 200 casual staff during harvest, Red Rich has a team dedicated to quality, reliability and customer satisfaction. Their meticulous quality program protects the fruit; ensuring that their customers receive the highest quality, freshest produce, that looks amazing and provides an exceptional taste experience that will satisfy local, interstate and export customers everytime.

www.redrichfruits.com.au



For Export

Apples: Fuji, Granny Smith, Pink Lady®.

Pears: Beurré Bosc, Packham.

Contact

Michelle Ross

Export Manager

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Scott Bros

Scott Bros (Scott Brothers Group Pty Ltd) is a well-established business located in the Huon Valley, Tasmania. The Huon Valley is next door to the Southwest National Park, which is part of the Tasmanian Wilderness World Heritage Area, renowned for its rugged mountain ranges, ancient rainforest and pure clean rain water. Combined with the protective hills surrounding it, all of these factors create an excellent growing environment for apples.

The orchard consists of 32 hectares of various apple varieties including the Tiger Fuji variety, which was developed by Scott Bros and has been well received in China, Taiwan, Malaysia and Hong Kong.

Tiger Fuji apples have robust qualities akin to the Tasmanian Tiger, which was a carnivorous animal with distinct stripes native to Tasmania. Tiger Fuji apples have a large fruit size, high sugar content, firm but delicate flesh with an attractive striped appearance and boast excellent storage ability and shelf life. These qualities make the Tiger Fuji a perfect example of a fresh food export product.

Scott Bros also comprises an export registered packing shed and up-to-date cool storage facilities. They have a long history of exporting apples to markets all around the world including countries in Europe, India and many Asian markets.

www.scottbrothers.com.au



For Export

Apples: Fuji, Gala, Red Delicious, Tasmania Tiger Fuji™.

Contact

Andrew Scott
Managing Director
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E: admin@scottbrothers.com.au

Super Fresh

Super Fresh is an Australian grower and packer of fresh produce. As a family business, their expertise is in apple and pear growing.

Super Fresh owns and operates multiple apple and pear orchards in the most popular and well known Victorian fruit growing district of Shepparton. With cold storage and packing facilities located on their main site, they are able to closely oversee day-to-day operations.

With experience since 1979, Super Fresh strive to provide premium quality produce globally all year round. Super Fresh distributes fruit to retail, wholesale and international markets and pride themselves in their ability to adapt to new markets and respond to industry change.

www.super-fresh.com.au

For Export

Apples: Granny Smith, Pink Lady®.

Pears: Packham, Williams.

Contact

Jaggie Singh
Director
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E: superfresh@westnet.com.au

Tenfarms Pty Ltd

Tenfarms was established by David and Anthony Holman to facilitate direct trade from farm to markets both within Australia and overseas. From its base in the new wholesale markets at Epping, Victoria and the Sydney markets in NSW, Tenfarms has also developed ripening, storage and distribution facilities for stock requiring city based consolidation.

Their apple and pear sales directly to supermarkets, independent retailers and overseas markets helped improve net farm returns resulting in a more sustainable future. Innovation in farming technology, packaging, storage and distribution is essential and Tenfarms has brought great farmers together to achieve these goals.

Tenfarms largest two farms in Victoria's Goulburn Valley use new dynamic controlled atmosphere (DCA) technology for the medium and longer term storage of apples and pears. DCA storage identifies the lower oxygen limit of pears using chlorophyll fluorescence.

It is termed 'dynamic' CA because it allows the storage manager to customise the oxygen concentration at the beginning of storage and change it during storage, as the lower oxygen limit changes. DCA is appealing because it is non-chemical; uses existing CA technology; can be monitored electronically in real-time; extends the storage time of fruit; and controls superficial scald and other storage disorders.

www.tenfarms.com.au



For Export

Apples: Fuji, Gala, Granny Smith, PinkLady®.

Pears: Beurré Bosc, Corella, Nashi, Packham, Paradise, Red Anjou, Williams.

Contact

Frank Frappa
Export & Wholesale Sale Manager
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M: +61 417 424 439

David Holman
General Manager
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Wintersun Fruit

Wintersun Fruit was founded by Brad Smith in 2002, as a marketing company for select growers of quality apples and pears from the premium growing regions of the Goulburn and Buchan valleys, which are situated in Victoria.

Wintersun Fruit still markets exclusively for those growers but has since expanded to have its own farms (500 acres), a transport division and an export division. Their product range has increased to include stone fruit and they are also Australia's largest marketer of chestnuts.

The customers of Wintersun Fruit are provided with dedicated personal service and quality products direct from their four modern packing facilities.

www.wintersunfruit.com

For Export

Apples: Gala, Granny Smith, Joya®, Pink Lady®, Red Delicious.

Pears: Beurré Bosc, Corella, Packhams, Williams.

Contact

Rodney Barnes
Export Manager
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10.3 Fruit Preparation Fact Sheets

10.3.1 Pest Species Information Sheets

Table 7. Monitoring of pests and diseases of concern in Australian apple orchards.

Diseases	Monitoring methods
<p>Apple Scab/Black Spot (<i>Venturia inaequalis</i>)</p>	<p>Apple scab spores over-winter on fallen leaves on the orchard floor. Monitoring of spores is not done by crop scouts as spores are too small to observe. However the disease is controlled by the integrated pest management techniques of monitoring the weather conditions (temperature, rainfall, leaf wetness, humidity) and knowing when to treat with fungicides and which fungicides should be used. The warning services are usually coordinated on a district basis and are based on specialist computer based equipment.</p> <p>The computer based management tools usually incorporate a temperature based 'day degree' accumulation that models the maturity of the overwintering spores and predicts the proportion of the spores that will be released during each favourable weather event. This assists in the crop consultants and the orchardists decision making process.</p> <p>If infection of trees does occur then black spots are visible on apple leaves and fruit. The infected apples are removed from trees during the hand thinning process. Fruit with black spots are also sorted out as reject fruit in the several inspection processes in the packing sheds.</p>
<p>Brown Rot (<i>Monilinia fructicola</i>)</p>	<p>This is the causal organism of brown rot disease in stonefruit and will often infect stonefruit in wet years if appropriate hygiene practices and fungicide applications are not followed. On rare occasions it attacks injured apple and pear fruit as they ripen. The disease on apples is known outside Australia as American brown rot. The main brown rot species that infects apples, <i>M. fructigena</i>, is not present in Australia.</p> <p>Infection symptoms are similar to brown rot infections of stonefruit and would be apparent on ripening fruit in the field or after a period of cold storage. Because of its rarity, most crop monitoring staff would never have seen this disease in Australia and any observations would trigger a biosecurity investigation.</p> <p>Control measures other than sanitation are not warranted, but fungicides applied for more common apple diseases (black spot/scab and powdery mildew) will control the disease.</p>

6. Pests and diseases identification, lifecycles and damage

Fruit flies: Queensland fruit fly, Lesser Queensland Fruit Fly and Mediterranean fruit fly

IPM quick facts

- Queensland fruit fly and Mediterranean fruit fly are among the most serious pests of horticulture in warmer regions.
- Quarantine and orchard hygiene are critical to good fruit fly control. Monitoring by using pheromone-based traps is recommended to improve the accuracy of spray applications.
- Where sprays are necessary, consider bait sprays for light to moderate infestations.
- Be aware that use of broad-spectrum insecticides is likely to cause secondary pest problems.

The pests and their impact

Two of these species of pest fruit flies have a major impact on apple and pear fruit production in Australia. In addition to their potential to severely damage fruit, their presence imposes restrictions on interstate and international export markets.

Queensland fruit fly

The Queensland fruit fly (*Bactrocera tryoni* QFF) is endemic to the Northern Territory, Queensland, parts of New South Wales and north-east Victoria. Outbreaks occur sporadically in other mainland States. In 1989 and 2015 outbreaks were detected in Perth, Western Australia. Successful eradication campaigns were undertaken using baits, male lures and sterile insect techniques. QFF pest free status was reinstated in Western Australia in March 2016.

QFF has a red-brown thorax and dark brown abdomen and is about 6 to 8mm long. QFF infests over a hundred species of fruit and vegetables and in addition to apples it is a significant pest of citrus, stone fruit and many tropical fruits.

Lesser Queensland fruit fly

The Lesser Queensland fruit fly (*Bactrocera neohumeralia*) is generally not regarded as being as serious a pest as QFF. It does not have as wide a distribution and has been found in restricted distribution in Queensland and New South Wales. It is mainly found along the tropical and subtropical east coast of Australia as far south as northern NSW. It has a similar host fruit range to QFF. It is similar in appearance to QFF but has dark humeral calli whereas QFF's are yellow. Humeral calli are located just behind the head, at the outside of the thorax (middle), at the forward point of the 'shoulders' of the fruit flies.



Queensland fruit fly

Mediterranean fruit fly

Mediterranean fruit fly (*Ceratitis capitata*: medfly) is able to tolerate cooler climates better than most tropical fruit flies. It therefore has the potential to spread to southern production regions that are climatically unsuitable for

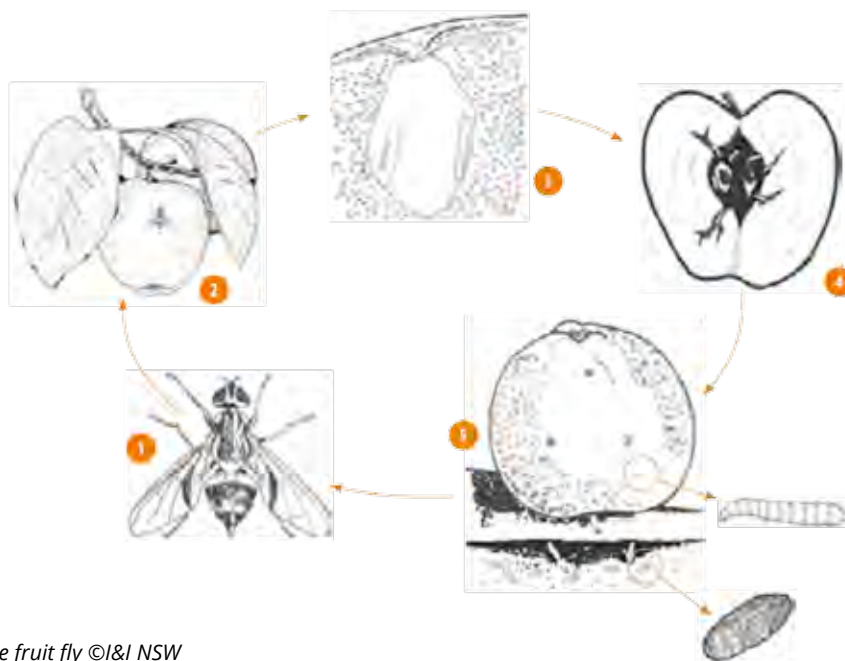
QFF. It is currently restricted to areas of Western Australia as far south as Esperance and as far north as Derby. The main area of infestation extends from Carnarvon to Bunbury.

Medfly has an extremely large host range and is able to infest over 200 fruit and vegetable species. The adult fly is 3 to 5mm long. The body is light brown and the wings are mottled, with two distinct bands extending to the wing tips. The abdomen is brown and is encircled by two light-coloured rings. The thorax (middle) has irregular patches of black and silver. Medfly cannot spread naturally to the Eastern states due to the vast natural desert barrier and there are strong domestic regulations in place regarding treatments and movements of fruit and vegetable to and from eastern and Western Australia.

Life cycle

The diagram below is a generalised fruit fly life cycle. There are significant differences between QFF and medfly in terms of development. During warm weather in spring or early summer, adult fruit flies feed and mate **1**. Adult flies feed on sweet exudates, including nectar, from plants. Females follow the scent of ripening fruit or vegetables and lay their eggs **2**. Female fruit flies can lay 500 to 800 eggs during their 6-month life. Eggs are white and banana-shaped and are placed in a cavity in the flesh close to the skin using the female's retractable, needle-sharp egg-laying organ, called an ovipositor **3**. This results in a distinctive 'sting' on the surface of the fruit. In warm weather, the eggs hatch in 2 to 4 days. Development of larvae (maggots) takes 6 to 8 days in summer. They tend to create tunnels that lead toward the centre of the fruit. The flies introduce bacteria to the fruit, which in turn causes the fruit to develop a severe internal rot. Fruit may appear perfect from the outside **4**.

Infested fruit often falls to the ground. When the maggot has completed growing, it chews its way out of the fruit and burrows into the soil **5**. In the soil, the larva become inactive and develops into an oval, brown pupa, in which the adult fly develops. Often the fruit fly is able to survive through winter in this pupal form. Both medfly and QFF can exist in their adult forms during winter in warmer regions, although development and the life cycle slow.



Generalised life cycle of the fruit fly ©I&I NSW

10: Appendices (cont.)

Damage

The egg-site punctures in the fruit are commonly referred to as 'stings'. Stings are more obvious on pale, smooth-skinned varieties such as Granny Smith or Cripps Pink apples. Infested fruit may fall from the tree as a result of larval infestation. The style of damage caused by fruit fly larvae varies with the type and maturity of fruit, the number of larvae in it, and the weather. In most fruits the larvae burrow toward the centre and a brown, mushy decay usually develops quickly.

In hard or immature fruit a network of brown channeling or 'tracks' is usually seen, followed by internal decay.

Similar damage

Damage caused by fruit fly infestation is quite distinctive. Although a range of fungal pathogens cause internal breakdown of fruit, the presence of maggots is diagnostic for fruit fly damage. Fruit flies can cause premature fruit fall, even if the fruit appears externally perfect. This symptom is shared with a number of other pests. Where the problem is caused by fruit fly, cutting the fruit should reveal maggots.



Queensland fruit fly.



Trapped QLD fruit flies.



Male sex pheromone fruit fly trap.



Ceratrap protein fruit fly trap.

Codling moth

IPM quick facts

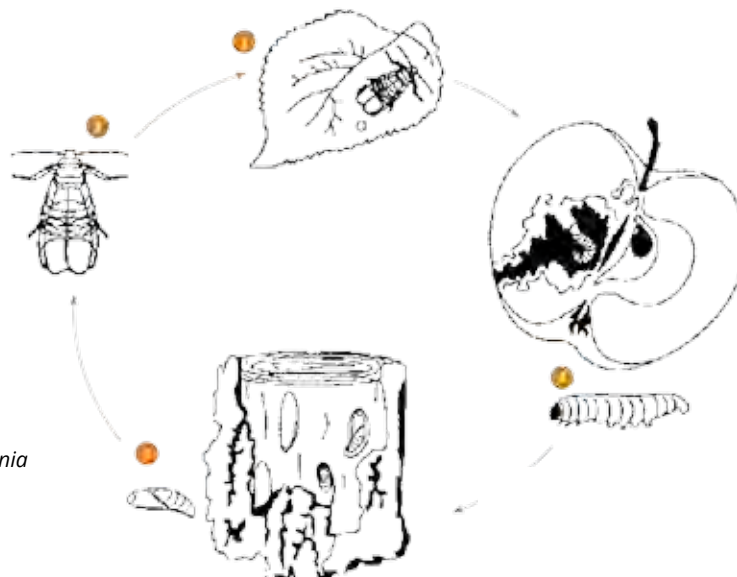
- By taking preventive action such as destroying infested fruit, bulldozing and burning neglected trees, and cleaning fruit harvest bins, the number of codling moths infesting the orchard can be reduced.
- Codling moth numbers can be monitored by using sex pheromone traps and feeding attractant; these traps can be used to optimise spray timing.
- Mating disruption can be an effective tool against codling moth. Mating disruption works best when used in large blocks of similar trees.
- Care should be taken when applying pesticides for codling moth so as not to deplete populations of the natural enemies of other apple pests.

The pest and its impact

In most Australian apple and pear production regions codling moth is considered the most damaging pest of apples. Western Australia is an exception. In that State, rigorous eradication, surveillance and quarantine measures have excluded the codling moth. In other regions, maintaining low numbers of codling moths is a high priority, and most orchardists are willing to invest heavily in management of this pest. If the moth is not managed it is possible for 95% of fruit to be damaged.

Codling moth originated in Europe but is now present in almost all fruit growing regions worldwide. In recent years in some districts codling moth numbers have tended to increase, most likely as a result of the introduction of 'softer' insecticides and management practices. However with good monitoring, the use of mating disruption and targeted insecticide treatments this pest is well controlled in the great majority of commercial orchards.

Adult codling moths have a 12 to 19mm wingspan and a body length of around 9mm. They have a grey-brown body with patterns of white lines on the wing. A bronzed area at the tip of the wing is characteristic of this species. Larvae (grubs) become larger as they develop through a number of instars (development stages). First-instar larvae are white with a black head. Later instars become progressively darker shades of pink. At maturity the larvae measure 10 to 15mm in length.



*Life cycle of the Codling moth.
Adapted from University of California
Pest Notes. Publication 7412*

Life cycle

During winter, codling moth larvae enter diapause (a physiological state of dormancy) within thick silken cocoons ①. These cocoons are hidden under loose bark or in soil or debris around the base of the tree. They can also be present between the boards of wooden fruit harvest bins. Within the cocoons the larvae pupate to become adult moths and emerge, usually around the time that apple trees bloom ②. These moths are active for only a few hours before and after sunset, and they mate when the sunset temperature exceeds 16°C. Each mated female moth will lay around 20 to 70 tiny disc-shaped eggs, singly on leaves, fruit or twig spurs over a period of around a week ③. The time that these eggs take to develop and hatch into larvae is influenced by temperature.

Upon hatching, young larvae immediately seek out a fruitlet. They may feed briefly on the surface of the fruitlet before tunnelling into the fruit to feed on its flesh and seeds ④. Within the fruit the larvae progress through further developmental stages ('instars'). The fifth-instar larva emerges from the apple and falls to the orchard floor. Sometimes the damaged apple falls from the tree with larvae still inside it. It then finds a sheltered position often by crawling part way up a tree trunk and sheltering under loose bark – and pupates to later emerge as an adult moth.

This cycle is repeated a number of times during a single season. The number of cycles (or generations) per season is largely dependent on the prevailing temperatures experienced in the fruit-growing region. Warmer regions are more likely to have greater numbers of generations. Typically there is one generation per season in Tasmania, two in the major apple fruit producing regions of New South Wales and three in Victoria's Goulburn Valley, parts of South Australia and south-east Queensland. As the season finishes and temperatures fall, the pupa within its cocoon enters diapause and remains dormant until the following spring.

Damage

Damage caused by codling moth can be of two types. The first larvae to reach fruit often feed on the surface of the fruit before finding a site in which to tunnel. This initial feeding results in shallow excavated areas known as stings. Stings can also occur where young larvae penetrate a short distance and then are killed by insecticides or other means. Deep tunnels within the fruit are caused by the larvae tunnelling toward the core of the apple, where they feed on the seeds. Often the fruit flesh around these tunnels is broken down by bacteria and the tunnels are plugged by the insect's excreta (frass), which resembles sawdust and can often be seen exuding from the entry hole. As the larvae leave the fruit they again tunnel through the flesh to reach the exterior. This internal injury can lead to premature fruit ripening and cause the apple to drop from the tree.

Similar damage

Damage resembling codling moth stings can be caused by *Heliothis* (budworms) or loopers. Tunnels in fruit can also be caused by oriental fruit moth. It is important to make sure that the insect causing the damage is codling moth, as control measures may not be effective against other insects.



Codling moth larvae.



LBAM damage



Codling moth trap in orchard.

Lightbrown apple moth

IPM quick facts

- LBAM should be monitored fortnightly from bud movement onwards.
- Early monitoring should include pheromone trapping. Later sampling is of leaves, shoot tips and fruit clusters.
- The pest is favoured by cool conditions so infestation and damage often occurs in autumn if treatments are not applied when monitoring reached action thresholds.
- Mating disruption can be an effective tool against LBAM. Mating disruption works best when used in large blocks of similar trees.
- Care should be taken when applying pesticides for LBAM so as not to deplete populations of the natural enemies of other apple pests.

The pest and its damage

Lightbrown apple moth (*Epiphyas postvittans*) (LBAM) is native to South East Australia, including Tasmania, and has also been introduced to Western Australia. It attacks nearly all types of fruit crops and many vegetables and ornamentals. LBAM is adapted to cooler conditions, causing major problems in the cooler regions of New South Wales, Victoria, South Australia and Tasmania. Adult moths are about 10mm long and variable in colour. They are usually yellowish brown, with darker brown markings on their wings.

Eggs are laid on the surface of almost any smooth leaved plant, and tiny larvae emerge. These larvae undergo several growth stages as they become bigger, but their appearance remains essentially unchanged. Larger larvae construct a feeding shelter by curling leaves with silken webbing and pupate to become adult moths.

Leaves: Young larvae construct a silken web on the undersides of leaves and feed on tissue beneath the upper surface. As the larvae grow, they migrate from these protective shelters and construct larger silken shelters between leaves, between leaves and fruit or on single leaves. These later-stage larvae feed on all leaf tissue except the main veins. Feeding on leaves is not economically damaging, but the sticky webbing is uncomfortable for pickers.

Fruit: Feeding damage to fruit takes place beneath the protective canopy of webbed leaves. Feeding sites are shallow but can be extensive. This is particularly the case when larvae have found shelter in the middle of a fruit cluster. The larvae will cause damage to all fruit within the cluster.

Lifecycle

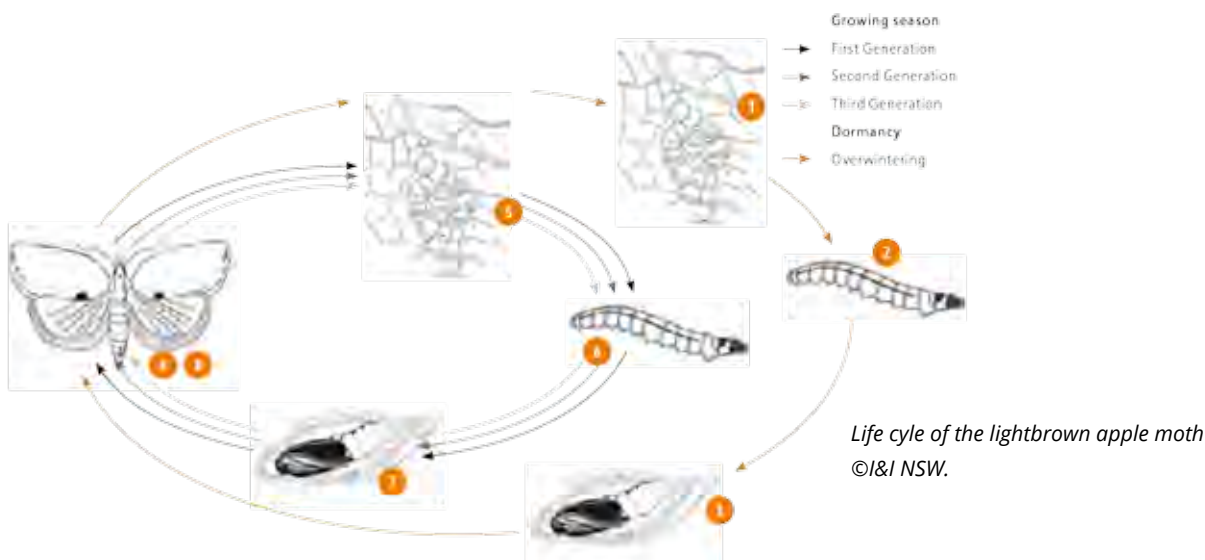
Unlike many other moth species, LBAM does not truly hibernate. Female moths lay eggs in early autumn¹ and the young moth larvae survive the winter on ground-cover plants, fallen leaves and fruit buds and occasionally under bark². These larvae continue to feed on warm winter days and complete their development. They spin a loose silken cocoon and change to pupae in the spring and early summer³. The newly formed pupa turns from green to brown. After a few weeks the insect emerges as an adult moth⁴.

Male moths emerge a short time ahead of female moths. The moths are seldom seen, but are about 10mm long. Their colouring is variable but is usually buff with darker brown markings on the forewings. Females often have

10: Appendices (cont.)

have a dark spot on the hind margin of the fore wing. Female LBAMs produce and emit a powerful sex attractant, also known as a pheromone. The pheromone is released in the evening, particularly around dusk, and attracts male moths over long distances.

Females normally mate only once and begin to lay eggs 1 to 7 days later⁵. Most eggs are laid 6 to 10 days after the moths emerge. A single female can lay up to 1500 eggs (average 300) over a period of up to 3 weeks.



Eggs are laid in batches of about 30 to 35 per batch. They are laid almost exclusively on the upper surfaces of leaves. The eggs are scale-like and an aqua colour; they are difficult for the untrained eye to detect and identify. The eggs darken before hatching.

The larvae (caterpillars) typically hatch within 1 to 2 weeks⁶. Young larvae are pale yellow and small (about 1mm long) and disperse by crawling or dropping silken threads. They settle on the under- surface of the leaf (often near the mid-rib) and spin a small protective cocoon, where they feed and complete their first moult. The larvae then abandon this shelter and move to a feeding site where they construct a more substantial feeding shelter or nest. Feeding nests are made by webbing together two sides of a leaf, two adjacent leaves, or leaves to a fruit or several adjacent fruit. Fruit calyces are also frequently used as feeding nests.

The larva passes through six developmental stages (or instars), increasing in length to about 18mm. Mature larvae are pale to medium green, with a darker green central stripe.

Fully mature larvae develop into pupae at the feeding site⁷. The moth emerges a few weeks later⁸. This pest can complete several generations in a single fruit-production season. For example, in Victoria there are three or four distinct generations each year; the number is governed by the climate (principally temperature).



Light brown apple moth larvae



Codling moth



Light brown apple moth: female (left), Male (right)

Oriental fruit moth

IPM quick facts

- By taking preventive action such as destroying prunings, infested fruit, bulldozing and burning neglected trees, and cleaning fruit harvest bins, the number of Oriental fruit moths (OFM) infesting the orchard can be reduced.
- OFM numbers can be monitored by using sex pheromone traps and feeding attractant; these traps can be used to optimise spray timing.
- Mating disruption can be an effective tool against OFM. Mating disruption works best when used in large blocks of similar trees.
- OFM is mainly a pest of stonefruit and pears and is a minor pest of apples. However these three fruits are often grown in neighbouring orchards and OFM should be monitored in apple blocks and neighbouring stonefruit and pear blocks and treated in apple blocks if required.

The pest and its damage

The oriental fruit moth (*Grapholita molesta*) (OFM) is mainly a pest of stonefruit. It is sometimes a pest of pears and apples. It is mainly found in orchards of the Goulburn and Murray valleys in Victoria and is a minor pest in the warmer fruit growing districts of NSW and South Australia.

In stonefruit damage is caused by the larvae, which feed on shoots, causing them to distort and dieback. These infestations are most apparent on the young, green actively growing shoots. Monitoring of stonefruit blocks near apple orchards will alert growers if the pest is in high numbers and preventative treatment may be necessary.

During summer, OFM bore into fruit of mainly stonefruit but occasionally apples and pears. Mature, softening fruit is most susceptible, but when the numbers of larvae are high immature fruit can also be attacked. The subsequent tunnels in the fruit make it unmarketable and are often an entry point for decay organisms and rots. When boring into both fruit and shoots, larvae excrete frass. This excretion distinguishes wounds caused by OFM from those caused by mechanical damage such as hail.

Lifecycle

There are several generations of OFM per year in the warmer climates. Oriental fruit moth overwinter as mature, dormant larvae inside tightly woven cocoons in protected places on the tree or in the trash near the base of the tree. In early spring, pupation takes place inside the cocoon and adult moths begin emerging. Eggs are laid onto newly emerged shoots and leaves and the larva feed in shoot terminal where they complete their development. Second-generation larvae feed in shoots, but fruit of some early maturing stonefruit cultivars may also be attacked. Subsequent generations may attack shoot terminals and green fruit, but as fruit matures it becomes the preferred site of attack by this pest.

Woolly apple moth

IPM quick facts

- Woolly aphid causes damage to trees both above and below ground. Controlling infestations below ground is critical to successful management of this pest.
- Choose rootstocks carefully in areas prone to infestation.
- Monitor trees in late summer and autumn and identify and mark any trees which have fluffy white aphid colonies present. Be careful to examine pruning scars and rough bark as well as the axils of shoots and branches.
- Use an insecticidal soil drench between green tip and petal fall on trees marked during monitoring.
- Be selective in choosing insecticides for spraying this pest (and other pests) as some sprays are likely to kill the parasitic wasp, , which is an effective biological control agent of woolly aphid.

The pest and its impact

The woolly apple aphid (*Eriosoma langigerum*) is a serious pest of apple production in all Australian fruit growing regions. This pest can infest apple trees and very occasionally pears. It can affect all parts of the tree, resulting in direct damage to fruit and limbs and a gradual decline in tree health. Because of its characteristic wool and it's stickiness it also has an effect on orchard operations – particularly summer pruning, thinning and harvesting.

Life cycle

Woolly aphids survive through winter as either an adult or an early-stage nymph called a crawler. Crawlers are oblong, flattened, and a mealy grey to brown colour. These crawlers find sheltered positions in cracks and crevices in the bark; most disperse to the base of the tree and infest the roots. After finding a suitably sheltered feeding site, the crawler inserts its long feeding apparatus and settles. Crawlers feeding on the roots cause large galls to form. These overwintering crawlers are long-lived and become dormant (i.e. they enter diapause) as temperatures decrease. As temperatures increase as spring approaches, crawlers become active and begin to disperse.

Crawlers in root colonies may migrate into the tree canopy and vice-versa. Crawlers grow and moult four times before becoming adults. Later nymphal stages grow larger with each moult and produce the characteristic white wool. There are two types of adult. The most common form has no wings and is asexual. The wingless adult aphid is about 2mm long. It does not lay eggs but produces an average of 120 live young during its life. Woolly aphid can have 10 to 20 generations per season. Toward the end of summer – particularly in warm regions winged adult female aphids appear. They are commonly found sitting on top of colonies of wingless individuals. They are a dull blue-grey to black and slightly larger than the wingless form. This species reproduces entirely via parthenogenesis, that is they produce live young.

Woolly clusters or colonies occur because, although dispersive, crawlers often settle close to their parent.



Woolly apple infestation of apple shoots

Fluffy colonies are typically found in old pruning wounds and scars on major branches and on the trunk and water shoots. Colonies begin at nodes and spread up and down the shoot. Woolly aphids are spread through the orchard by wind and by planting infested nursery stock. Crawlers migrate between roots and shoots throughout the season, but as winter approaches those moving to the roots form dormant colonies.

Damage

Limbs and shoots: The most obvious sign of woolly aphid infestation is the presence of white woolly colonies. During summer, colonies form on actively growing terminals and water shoots. These aphids produce copious quantities of sticky honeydew, which is released, falls on the fruit and shoots beneath, and fosters the development of sooty mould, resulting in fruit downgrading. In addition, brushing and crushing aphids during summer thinning, pruning or harvesting releases their body fluids, leaving purple stains on skin and clothing. This stickiness and the woolly filaments make orchard operations very uncomfortable.

Winter colonies do not produce the white wool commonly seen in summer. As winter approaches and colonies decline and lose their wool, galls become apparent. Galls occur when aphid feeding induces cell division and proliferation, resulting in the appearance of woody outgrowths. Galls in leaf axils disrupt the production of fruit and vegetative buds. This may seriously disfigure young trees and nursery stock.

Roots: Feeding by woolly aphid also causes galls to form on the roots. Root galls can be very large, and continued feeding can kill roots, stunt tree growth and kill young trees. Because galls are prone to splitting at 0°C, they can predispose trees to infection by soil-borne diseases in colder areas.

Fruit: If aphids are in high numbers they produce a lot of sticky honeydew, which falls on to fruit. This becomes a food source for the fungus that causes sooty mould. Occasionally, if numbers of the pest are particularly high, the aphid will infest the calyx end of the fruit. This is particularly the case in open-calyx varieties.

Similar damage

Although other pests (e.g. lightbrown apple moth and mites) produce webbing or woolly shelters, it is difficult to mistake these for the aerial colonies of woolly aphid. Woolly aphid tends to infest leaf axils, and its colonies are sticky with honeydew. Root galling is a little more difficult to distinguish from galling caused by nematodes or crown gall or a number of other pests. However, it is very rare for root infestations to occur without accompanying aerial infestations. Where root galls are found, the presence of aerial colonies is adequate confirmation that woolly aphid is responsible.



Woolly apple aphids parasitised by *A. mali* wasps.



Soil drench application of woolly aphid insecticides



Woolly apple aphid on tree roots

Weevils: Fuller's rose weevil and Garden weevil

IPM quick facts

- Weevils are pests of apple and pear production because they damage fruit, leaves and roots and can also interfere with infrastructure such as irrigation.
- Weevils are difficult to control once they are established. Therefore, effort needs to be put into preventing infestations. Orchard hygiene can reduce the chance of a serious weevil infestation. Weed control is important.
- A range of insecticides are registered for use against pest weevils. Always choose the pesticide that is likely to have least effect on natural enemies of weevils and other orchard pests.

The pests and their impact

Various species of weevils are pests in all Australian apple production regions but are particularly serious in Western Australia, Victoria, Tasmania and South Australia. They cause direct damage to the fruit and leaves of apples. Some species also lay their egg masses in sprinkler heads, blocking them and disrupting irrigation. Adult weevils are nocturnal and flightless and hide in cracks in the soil, under soil clods or between fruit during the day.

The two species of concern for export destinations are Fuller's rose weevil and Garden weevil.

Fuller's rose weevil (*Pantomorus cervinus*)

Adult Fuller's rose weevils are approximately 8mm long. They are grey-brown and darker on the sides, with a distinguishing, short white line halfway down the body. They are flightless.

Garden weevil (*Phlyctinus*)

Adult garden weevils are approximately 7mm long. They are grey-brown with a prominent, pale V stripe at the base of the abdomen. They have a bulbous abdomen and are flightless.

Life cycle

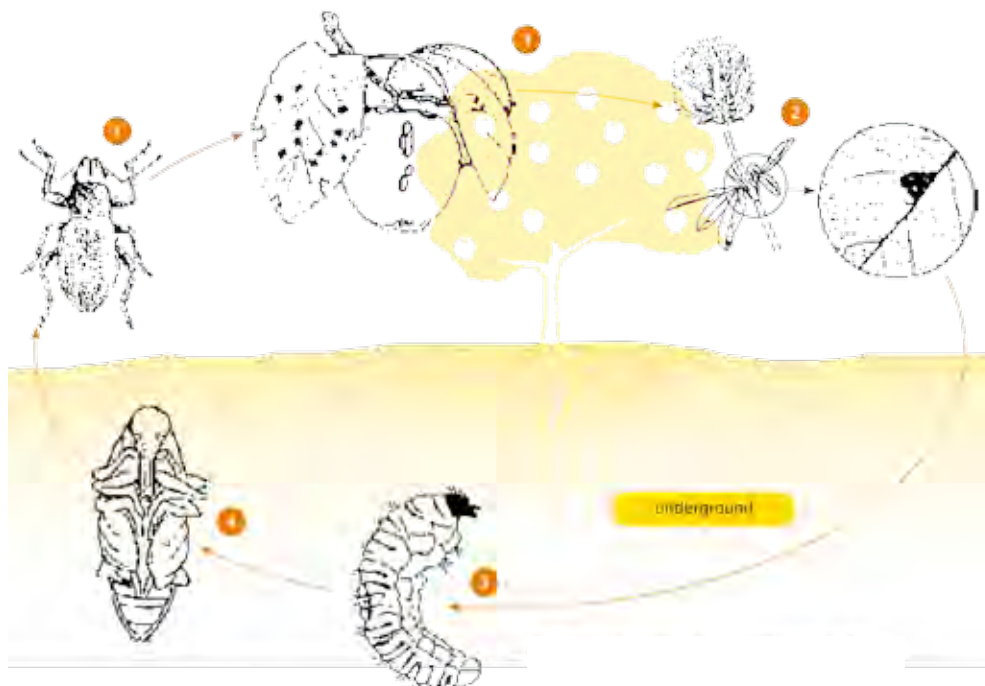
The life cycle is generalised but will help orchardists to target IPM strategies at more susceptible phases of the pest's life.

Adult weevils emerge from the soil in late spring or early summer^①. Both species of weevil are flightless, but are strong climbers. They make their way up into the canopies of apple trees and other vegetation and begin to feed on leaves and fruit^②. When disturbed, most species drop to the ground and feign death. There is usually only one generation per year, but sometimes two.

Eggs are oval-shaped, golden and laid in loose clusters or groups^③. They are laid in sheltered positions; common sites include the sheathing stipules of clover; new shoots of lucerne; splits in the bark of vines, shrubs and trees; and vegetable litter on the orchard floor. Fuller's rose weevils have a habit of laying egg masses in fine irrigation tubing and spray heads. The egg masses are resistant to drought and hatch when conditions become suitably moist. The minimum length of time between laying and hatching varies between species but tends to be between 10 and 20 days.

Upon hatching, young weevil larvae burrow immediately into the soil to a depth of 25 cm, where they feed on plant roots^④. Initially larvae are yellow, but they become white as they mature. Fully mature larvae of most

species are about 9mm long. As spring approaches the mature larvae migrate closer to the surface and feed on shallow surface roots. The larvae develop into pupae⁵. These pupae are essentially adult insects in a soft, fragile state, neatly folded and enclosed in a protective skin. The length of this pupal period varies between species. For Fuller's rose weevils it is typically 10 days before the adult emerges, whereas for garden weevils the length of the pupal stage is commonly 3 to 4 weeks.



Damage

Fruit: Garden weevil adults cause direct damage by feeding on young fruit. Scarring results and fruit is often unsuitable for the fresh market. Weevils feeding on leaves excrete around the stem-end of fruit, resulting in downgrading. Feeding by apple weevil adults on fruit stalks (pedicels) causes partial or complete ringbarking, sometimes leading to early fruit fall and reducing fruit size.

Leaves: Leaves infested by weevils have a ragged appearance. Initially damage may occur more at the edges of the leaves, giving them a notched or serrated appearance, but as the infestation worsens the damage spreads across the leaf surface. Foliage near the trunk or touching the ground is most likely to be damaged. In extreme cases the whole leaf (except the veins), as well as the soft bark on the twigs and pedicels, can be eaten. In turn this can lead to premature fruit drop, water stress and small fruit size. Damage tends to be more severe on younger trees

Roots: Although larvae feed on plant roots they do not specifically target apple trees. Although some damage is likely, reports of significant losses are rare. Declining tree vigour is rare but has occasionally been reported. Root damage is apparent only when trees are removed and the severe root scalloping becomes apparent.

Similar damage

A number of other pests cause similar damage to apple leaves. Lightbrown apple moth (LBAM) feeds on the leaf surface, skeletonising it. If weevil infestation is responsible, the damage is more likely to be concentrated on the edges of the leaf. In any case, the pest itself is likely to be seen if sheltering leaves and fruit clusters are gently moved. Be aware that both weevils and LBAM larvae tend to fall to the ground when disturbed; care is needed to make the correct identification of the pest responsible.



Weevils and leaf feeding damage

Thrips: Western flower thrips, Plague thrips

IPM quick facts

- Plague thrips is a native species that infests flowers, causing fruit not to set.
- Western flower thrips (WFT) is an invasive pest that is becoming more widespread. WFT disfigures fruit when it lays eggs, causing a distinctive 'pansy spot'.
- Management of broad-leaved weeds, clovers and lucerne is critical to WFT management.
- If monitoring indicates that crop damage is likely, spray during blossom. Monitoring should be continued in case re-spraying is needed. Growers should incorporate thrips resistance management strategies.

The pests and their impact

Two species of thrips can cause damage to Australian pome fruit. The biology of these species are very similar, but the damage they cause and their management differs. Effective control of thrips can be undertaken only if you have identified which species of thrips is responsible for the problem. Accurate identification of thrips is only possible under a strong hand lens or a microscope.

Plague thrips

Plague thrips (*Thrips imaginis*) is a very common native species that damages a range of crops, including stone fruit. Females of this species are 1.1 to 1.3mm long and males are 0.8 to 1.0mm. Plague thrips are almost always female, particularly early in the season. They are generally a dusky brown, and the last two portions of the body are darker. However, identification can be confused, because yellow forms exist in some regions.

Western flower thrips (WFT)

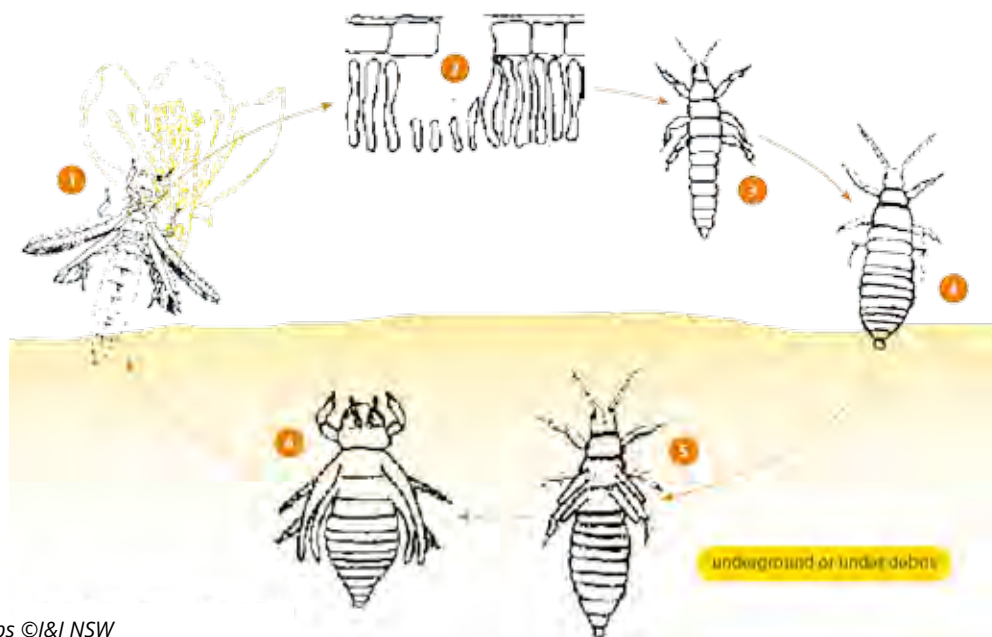
Western flower thrips (*Frankliniella occidentalis*) slightly larger than plague thrips. Females are 1.4 to 1.8mm long and males are 0.9 to 1.1mm. WFT are predominantly male at low population densities (usually early in the season) and mostly female when numerous. Females have banded antennae and a pattern of darker spots on the top of their abdomen.

Life cycle

The various species of plant-feeding thrips (including plague thrips and WFT) have similar life cycles, but important differences do exist and are noted on this page. Adult thrips are found mostly in flowers **1**. They infest a wide range of plants, and many weed species harbour large numbers of these pests; clover is particularly favoured, as are other broad-leaved weeds such as capeweed, dock and sorrel.

In the orchard thrips begin to infest the crop as early as bud swell, when females lay eggs in sepals and other flower parts **2**. WFT may lay its eggs into the developing fruit later in the season. Plague thrips may migrate from some distance away, but WFT usually overwinters on weeds or garden plants close to the orchard. Plague thrips is usually the more common species during the flowering period. WFT is more common during summer. Few thrips are found on the leaves. Eggs hatch into active, feeding larval or juvenile stages by late bloom. There are two larval stages, **3** & **4**, and these look like small wingless adults.

Larvae migrate to the ground, where they shelter under debris or soil and develop into inactive, non-feeding pupal stages **5** & **6**. Winged adults then emerge and can live from 28 to 90 days.



Life cycle of thrips ©I&I NSW

Damage

Both species of pest thrips can cause commercially significant damage to fruit. Although leaves are often infested, damage is usually limited to bronzing, which may be mistaken for mite infestation. Adult female WFT cause damage when they lay their eggs into young fruit. Pansy spotting (also called ghost spotting) occurs around the site of egg-laying. Although all varieties are susceptible to WFT, damage is more obvious on light-skinned varieties and on lighter portions of the fruit.

Plague thrips are native insects, and infestations often arise from surrounding bush. Adult insects feed on flower stamens and styles and can cause severe flower abortion. Often, if populations are low, this damage has a similar effect to flower thinning. However, heavy infestations can cause a large reduction in fruit set. The numbers of plague thrips are largely determined by what happens to their populations in the bush, and the severity of infestation is difficult to predict. Careful and frequent monitoring of blossoms is necessary.

Similar damage

Poor fruit set can be caused by many things, but plague thrips have been implicated in some cases. If plague thrips has been responsible then the thrips would have been present as tiny white larvae on stamen filaments in the flowers during very early petal fall.



'Pansy Spot' western thrips damage



Plague thrips (left) and western flower (thrips right) ©I&I NSW



Western flower thrips under microscope

Scales: San José scale, Apple mussel scale and Pear Scale

IPM quick facts

- San José scale is the main scale pest. It is difficult to control with conventional insecticides, largely because adults and most juvenile stages have a thick waxy covering. Control is mostly effective with winter oil applications.
- Pesticide applications must be precisely timed to when the highly mobile but unprotected 'crawlers' are present.
- Effective control can be gained by making annual, dormant, high-volume applications of horticultural mineral oil.

The pests and their impact

San José scale (*Comstockaspis* but formally known as *Diaspidiotus perniciosus*) infests a very wide range of mainly deciduous shrubs and trees, including apples, pears, stone fruits, grapes, kiwifruit, walnuts, willows, birches and elms. Their preferred habit is to form dense encrustations on the bark of their hosts, and at densities of over 100/cm² they have a gradual debilitating effect on branches. Branch death usually takes several years of continuous infestation. This has an effect on tree training. This, and an overall reduction in tree vigour and health, reduce fruit yields. The pests also feed directly on fruit and have a direct effect on fruit quality.

San José scale was once considered one of the most devastating pests of the apple and pear industries. The introduction of chlorinated hydrocarbon insecticides such as DDT led to a reduction in its importance, and this was maintained through the subsequent use of other broad-spectrum insecticides. With increasing use of more specific insecticides this pest is making a comeback in commercial plantings. San José scale can be found in all mainland Australian apple and pear growing regions. It has previously been found in Tasmania but is currently eradicated.

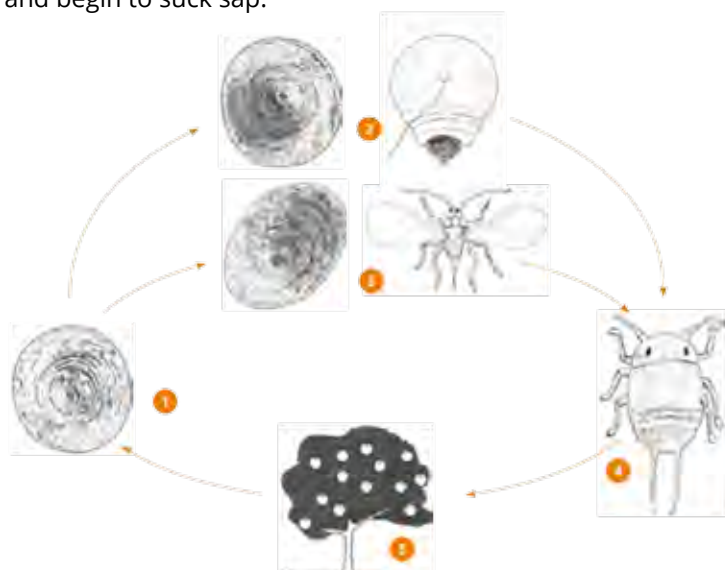
Apple mussel scale (*Lepidosaphes ulmi*) and pear scale (*Diaspidiotus pyri*) are minor pests in comparison to San Jose Scale. Pear scale is only found in Tasmania. Apple mussel scale is also known as oystershell scale. They mostly inhabit a tree's bark but occasionally infest fruit where they are readily seen as they are 2.5mm long and dark brown.

Life cycle

The San Jose scale survives through winter in an immature state attached to the larger branches of trees. During this time it is around one-third grown. As temperature increases in spring the insect resumes growth **1**. This usually coincides with the beginning of blossom, but because development is dependent on temperatures the timing can vary. Although both begin the season as identical small scales, males and females develop differently and become distinct from one another. The body of the female is yellow, circular and flattened. It is hidden under a circular scale that is grey to black and has a raised light knob in the centre. This scale is around 0.9 to 1.4mm long **2**. Males are covered by a smaller, oval-shaped scale that also has a raised knob. Males emerge as minute (1mm long) yellow, two-winged insects **3**. Females remain under their scale and do not move throughout their entire lives.

Following mating females give birth to live young; they do not lay eggs. The developing young remain under the cover of the scale until they emerge as well-formed, mite-like insects. Their major distinction from mites is that they are bright yellow. These emerging insects are called crawlers **4**. They are highly mobile and disperse

throughout the tree. They can also disperse to nearby trees at this stage . Crawlers find a suitable **5** feeding site within 24-hours; they insert their slender thread-like mouthparts through the bark, or the surface of the fruit or leaf, and begin to suck sap.



Life cycle of San José. ©I&I NSW



San José scale on apple branch.

Soon after settling down to feed, crawlers shed their skin, legs and antennae and appear as flattened, yellow sacks. As they continue to grow, their body secretes wax that hardens to form a scale. Development depends on temperature, but typically they reach maturity in 6 to 8 weeks and there are two or three generations a year. Scales are often not completely dormant during winter, and all stages (except males) can be found throughout the colder months. Populations can build up during mild winters, requiring extra vigilance in spring.

Damage

Fruit: While feeding, San José scale injects a toxin that results in a distinctive red halo around the feeding site on the fruit. These halos can also be seen on younger, green, tender shoots and twigs. Apple fruit can become bumpy and may be misshapen and stunted where infestations are severe.

Limbs and branches: The toxin injected by San José scale during feeding results in the death of twigs and limbs and, over a series of seasons, an overall decline in tree vigour, growth and productivity. If infestations are unmanaged over a series of seasons, tree death can occur. Damage is usually more severe and occurs more rapidly on younger trees, which give easier access to succulent green tissues and have thinner bark. Young trees can be killed in 1 to 3 years.

Similar damage

The red halos associated with San José scale infestations and the presence of grey scurfy scale infestations make them quite distinctive from other pests and diseases. Superficial examination may result in the fruit pitting symptom being mistaken for boron deficiency or apple dimpling bug.



San José scale on apples.

Apple scab (Black spot)

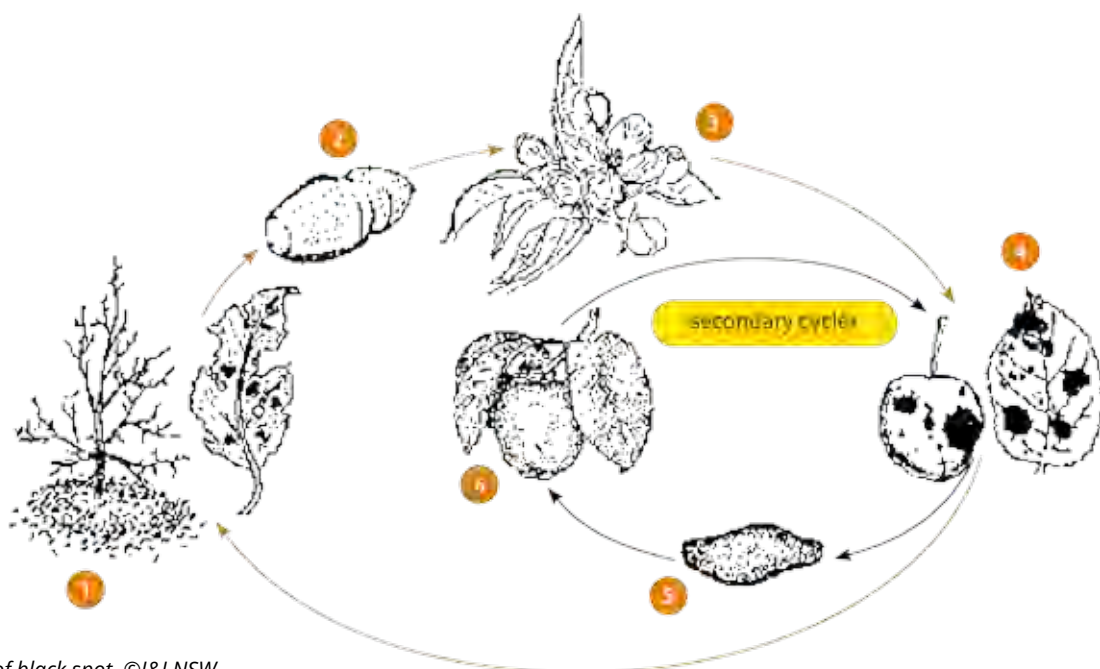
IPM quick facts

- Orchard hygiene is important. Remove all hanging infected fruit and hasten breakdown of fallen fruit during dormancy by mowing. Spray infected leaves with urea before leaf fall and mow fallen leaves to hasten breakdown.
- Infections depend on temperature and leaf wetness. Control of the disease early in the season is very important.
- Avoid calendar-based cover sprays. They waste time and money and have undesirable off-target effects.
- Protectant fungicides should be applied before rainfall.
- If a protectant has not been applied and a disease infection period is indicated by a forecasting service, a curative fungicide should be applied within the kickback period.

The pest and its significance

The fungi responsible for the disease in apples is *V* and in pears . The pathogen that infects apples cannot infect pears, and the pathogen that infects pears cannot infect apples. Apple scab is present in all Australian production regions, although only recently introduced into Western Australia and with limited distribution there. Pear scab is present in all regions. If these diseases are poorly managed they can cause serious losses in terms of the cost of control, reduced pack-out and reduced tree vigour.

It is important that orchardists know as much as possible about the pathogen's life cycle, as this understanding will help in logical management decision-making.



Life cycle of black spot. ©I&I NSW

Life cycle

As temperatures rise at the start of the fruit production season and when enough moisture becomes available, the spore-producing bodies within fallen leaves mature **1**. Primary spores (ascospores) from these bodies, settle on young, soft tree growth and infect it are shed into the wind **2**. These primary infections occur **3** only when leaves, fruitlets or flowers are moist from rain, dew or mist and the temperature is appropriate. Primary infections result in lesions **4** that produce a different type of spore **5**. These spores (conidiospores) can also spread through the orchard on wind currents and have slightly different temperature and moisture requirements that enable them to infect the leaves or fruits that they land on **6**. If management is poor, the secondary infection cycle can be repeated many times during a season and can result in a very rapid build-up of the disease, particularly during warm, wet periods. As trees become dormant, infected leaves are shed and fall to the orchard floor or are caught in branches. Where the pathogen remains, it stays alive but becomes dormant within these fallen leaves and becomes active again at the start of the next season.

Damage

Leaves: Scab lesions on leaves can occur on either surface but are usually more easily seen on the upper surface. Initially lesions are very small, olive-green or brown and have diffuse edges. These lesions become olive-green and velvety as they enlarge and mature. This colour and texture is due to the enormous number of secondary spores produced by each lesion. Where infections occur close together, lesions may coalesce to become very large.

In time, as spores are dispersed from the lesion, they become brown and areas of the leaf die. The leaves can also thicken and bulge upwards. Where infection is serious, leaves may yellow and fall prematurely, depriving the tree of nutrients and thus reducing fruit size in the current and future seasons.

Fruit: Symptoms on the fruit are similar to those on the leaves, although the lesions tend to have better-defined margins. As the lesions become older and shed their spores they become brown, dry-looking and corky, and cracks appear. At this stage the lesions look brown or black. Fruit growth is retarded in the vicinity of the lesions, and as the rest of the fruit continues to grow it may become distorted.

The lesions are superficial and the fungus does not extend to any great degree into the flesh of the apple.

Twigs: Twig infections are relatively rare in apple scab but can be common in pear scab. Early in the growing season, lesions on the young shoots appear as brown, velvety spots. These spots develop during the season to become corky, canker-like areas. Disease-causing spores can survive the winter in these lesions and cause disease the following year.

Storage scab: If scab infections occur late in the season, symptoms may not have had time to develop before harvest and storage. During the period of storage and immediately after apples are removed from storage, the process of infection continues. Apples that appeared healthy when placed in storage have small, often pinpoint-sized, lesions peppered over their surfaces upon removal from storage.



Apple scab on leaf.



Apple scab on fruit.



Apple scab on fruit.

Brown rot

The pest and its significance

(Monilinia frusicola)

This is the causal organism of the brown rot disease in stonefruit and will often infect stonefruit in wet years if appropriate hygiene practices and fungicide applications are not followed. On rare occasions it attacks injured apple and pear fruit as they ripen. The disease on apples is known outside Australia as American brown rot. The main brown rot species that infects apples, , is not present in Australia.

Infection symptoms are similar to brown rot infections of stonefruit and would be apparent on ripening fruit in the field or after a period of cold storage. Because of its rarity, most crop monitoring staff would never have seen this disease in Australia and any observations would trigger a biosecurity investigation.



Brown rot on stonefruit.

10.3.2 Pest Species Monitoring Methods for Export

Table 7: Monitoring of pests and diseases of concern in Australian apple orchards.

Pests	Monitoring methods
<p>San Jose Scale (<i>Comstockaspis pernicioso</i>)</p> <p>Apple mussel scale (<i>Lepidosaphes ulmi</i>)</p> <p>Pear Scale (<i>Diaspidiotus pyril</i>)</p>	<p>These pests predominantly live on the bark of trees, and occasionally infest fruit.</p> <p>Inspection of the bark of apple trees during winter by pruning staff and pest scouts when there are no leaves on the trees and the sedentary scales on bark can be easily seen.</p> <p>Developing fruit are inspected during thinning and any fruit infested with scale are removed from trees.</p> <p>Inspection of fruit at harvest will easily reveal if any scales are on the fruit as an atypical red discolouration of the fruit's skin is visible around the scale, as a reaction by the fruit to the infestation.</p> <p>Inspection of fruit on sorting rollers by packing staff, with fruit infested with scale being rejected.</p>
<p>Plague Thrips (<i>Thrips imaginis</i>)</p> <p>Western flower thrips (<i>Frankliniella occidentalis</i>)</p>	<p>These pests are attracted to apple blossoms during flowering in spring. They depart the apple trees for other environments after petal fall. The blossom pest apple dimpling bug (<i>Campylomma liebknechtii</i>) is usually also monitored for during the blossoming period, using similar techniques. However, apple dimpling bug is not a pest of concern for export destination countries.</p> <p>Crop monitoring staff inspect apple blossoms on trees and "tap" insects into white plastic containers to count the numbers of thrips and apple dimpling bugs.</p> <p>Monitoring of blossoms of some weeds growing on the orchard floor (e.g. clover] or in nearby paddocks (e.g. wattles] is sometimes also conducted to give an indication of the general population of these pests in the orchard vicinity.</p> <p>Often the thrips are collected into jars or clip-lock plastic bags for later identification of individual species under microscopes.</p> <p>These pests do not infest developing fruit or fruit at harvest, but fruit that have sustained apple dimpling bug or thrips damage are removed from trees during thinning, or sorted from harvested crops in packing sheds.</p>

Table 7: Monitoring of pests and diseases of concern in Australian apple orchards.

Pests	Monitoring methods
<p>Codling Moth <i>(Cydia pomonella)</i></p> <p>Light Brown Apple Moth <i>(Epiphyas postvittana)</i></p> <p>Oriental Fruit Moth <i>(Grapholita molesta)</i></p>	<p>These moth pests are monitored by traps that have lures with a sex pheromone attractant for male moths. Traps are placed in orchards in early spring to coincide with the emergence of the moths from their overwintering pupation. Traps have sticky cardboard that traps the moths that are attracted, and allows identification and counting of moths by crop monitors who regularly visit the orchards. The data is interpreted by trained crop consultants who advise on the best control measures.</p> <p>These moth pests are commonly controlled by mating disruption techniques and when this is used then the lures used in traps have to be of a high dose, with 10 times the normal concentration of attractant. Traps that also use a feeding attractant lure are also used for monitoring of codling moths. Traps based on terpinyl acetate are often used as a feeding attractant for oriental fruit moths in orchards where mating disruption is being used.</p> <p>Traps are frequently checked early in the spring to determine when the moths are first emerging from over-wintering. This date is determined as the biofix date, and used in the computer based predictive modelling to assist the best timing of insecticides used for control. The models are based on temperatures to accumulate “degree days” which correlate with known pest lifecycles.</p> <p>Developing fruit are inspected during thinning and any fruit infested with larvae from these moth pests are removed from trees.</p> <p>Oriental fruit moth is considered a minor pest of apples, but will infest pears and stonefruit more readily. Hence if pear or stonefruit orchards are in the proximity of apple orchards they will be inspected as well to determine likely pest pressure.</p> <p>Inspection of fruit at harvest will easily reveal if any fruit are infested by larvae as entry holes are clearly visible. Infested fruit is either not harvested or is discarded.</p> <p>Inspection of fruit on sorting rollers by packing staff, with fruit infested with scale being rejected is also a standard practice.</p>
<p>Queensland Fruit Fly <i>(Bactrocera tryoni)</i></p> <p>Lesser Queensland Fruit Fly <i>(Bactrocera neohumeralis)</i></p> <p>Mediterranean Fruit Fly <i>(Ceratitis capitata)</i></p>	<p>These pests are monitored with traps. There are several different types of traps - some use a sex pheromone attractant, others use a protein based feeding attractant.</p> <p>Growers place the traps in orchards before fruit ripens to understand what the populations are and to indicate what level of treatment is required.</p> <p>Monitoring is often done in non-orchard areas e.g. in towns close to orchards and in non-commercial orchards. This provides an indication of the general pest pressure from fruit flies in a particular season.</p>

Table 7: Monitoring of pests and diseases of concern in Australian apple orchards.

Pests	Monitoring methods
<p>Black Peach Aphid (<i>Brachycaudus persicae</i>)</p>	<p>This pest first infests lower braches of trees or rootstock suckers so the lower limbs are inspected during spring. Specific scouting is usually not done for this pest, but it is easily seen when pest scouts are monitoring for other pests, or orchard staff are in the orchards for other tasks.</p> <p>It is rarely a pest after the full bloom stage of apple trees.</p> <p>It is more commonly a pest of stonefruit trees and infestations can cause stonefruit trees to flower earlier than usual, which is a sign of infestation, and an indication of the presence of the pest in an orchard that may have both stonefruit and apple blocks grown.</p>
<p>Fuller Rose Weevil (<i>Asynonychus cervinus</i>)</p> <p>Garden Weevil (<i>Phlyctinus callosus</i>)</p>	<p>Because of their size these pest are easily seen when monitoring staff are inspecting trees for blossom pest, or inspecting leaves for pest mites, or are in the orchard checking moth or fruit fly traps.</p> <p>As well as observing the pest, the monitoring staff can also see the feeding damage on the edge of apple leaves, or the frass that has been excreted by the weevils and is deposited on leaves or fruit.</p> <p>Often the weevils will shelter in the “touch points” between adjacent fruit or fruit and leaves.</p>
<p>Woolly Apple Aphid (<i>Eriosoma lanigerum</i>)</p>	<p>Woolly apple aphids mainly overwinter under the ground on the roots of apple trees. They can also over-winter in protected parts of the apple tree branches. They are clearly visible because of the white coloured “wool” that is excreted by aphids.</p> <p>Crop scouts and growers monitor for this pest by visual inspection. Because the pest does not spread very quickly between orchards growers can observe woolly aphid infestations in particular blocks in one season and concentrate on treatment of those blocks in the following winter and spring.</p> <p>Often the pest will infest rootstock suckers and be visible there before they infest the aerial parts of the apple trees.</p> <p>The use of the parasitic wasp, <i>A. mali</i>, is an important part of the integrated pest management of this pest. Pest monitors will inspect colonies of woolly apple aphids to see if the wasp has been active in parasitising the aphids.</p>

Table 7: Monitoring of pests and diseases of concern in Australian apple orchards.

Pests	Monitoring methods
<p>Apple Scab/Black Spot <i>(Venturia inaequalis)</i></p>	<p>Apple scab spores over-winter on fallen leaves on the orchard floor. Monitoring of spores is not done by crop scouts as spores are too small to observe. However the disease is controlled by the integrated pest management techniques of monitoring the weather conditions (temperature, rainfall, leaf wetness, humidity) and knowing when to treat with fungicides and which fungicides should be used. The warning services are usually coordinated on a district basis and are based on specialist computer based equipment.</p> <p>The computer based management tools usually incorporate a temperature based 'day degree-accumulation that models the maturity of the overwintering spores and predicts the proportion of the spores that will be released during each favourable weather event. This assists in the crop consultants and the orchardists decision making process.</p> <p>If infection of trees does occur then black spots are visible on apple leaves and fruit. The infected apples are removed from trees during the hand thinning process. Fruit with black spots are also sorted out as reject fruit in the several inspection processes in the packing sheds.</p>
<p>Brown Rot <i>(Monilinia fructicola)</i></p>	<p>This is the causal organism of brown rot disease in stonefruit and will often infect stonefruit in wet years if appropriate hygiene practices and fungicide applications are not followed. On rare occasions it attacks injured apple and pear fruit as they ripen. The disease on apples is known outside Australia as American brown rot. The main brown rot species that infects apples, <i>M. fructigena</i>, is not present in Australia.</p> <p>Infection symptoms are similar to brown rot infections of stonefruit and would be apparent on ripening fruit in the field or after a period of cold storage. Because of its rarity, most crop monitoring staff would never have seen this disease in Australia and any observations would trigger a biosecurity investigation.</p> <p>Control measures other than sanitation are not warranted, but fungicides applied for more common apple diseases (black spot/scab and powdery mildew) will control the disease.</p>

10.3.3 Agrichemical MRLs for apples in overseas markets

Apple and Pear Maximum Residue Limits – February 2017

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However, No absolute guarantee can be given that export MRLs will not be exceeded in all instances. It is therefore strongly recommended that this information be used in conjunction with residue monitoring to avoid violative residues.

Active ingredient ¹	Australia ²	Codex ⁴	Canada ³	China	European Union ⁵	Hong Kong ¹²	Indonesia ⁶	Japan ⁷	Malaysia ⁸	Singapore ⁹	Thailand
1-methylcyclopropene	Not required	not set	0.01	not set	*0.01	Not set	not set	0.01	not set	not set	not set
2,4-D	*0.05 (P)	*0.01	0.05	0.01	*0.05	0.01	not set	0.01	not set	not set	not set
6-benzyladenine	0.2 (A), T 0.2 (P)	not set	not set	not set	0.01	Not set	not set	0.05(A)	not set	not set	not set
Abamectin	0.01	0.01	0.02	0.02	0.03	0.02	0.02	0.02	not set	not set	not set
Aminoethoxyvinylglycine	0.1 (A)	not set	0.08 (A)	not set	not set	0.08	not set	0.09 (A), 0.08 (P)	not set	not set	not set
Ammonium thiosulfate	Not required	not set	not set	not set	not set	Not set	not set	not set	not set	not set	not set
Azinphos-methyl	1	0.05 (A), 2 (P)	2	2	*0.05	0.05 (A) 2 (P)	0.05	not set	not set	1	not set
Bifenazate	2	0.7	0.6 (A)	0.2 (A) 0.7 (P)	0.7	Not set	not set	2	not set	not set	not set
Bifenthrin	*0.05 (A), 0.5 (P)	not set	0.9 (P)	0.5	0.3 ^a	0.5	not set	1 (A), 0.5 (P)	not set	not set	0.05
Boscalid	2	2 (A)	3	2 (A)	2(A) 1.5 (P)	3	2(A)	2 (A) 3 (P)	not set	not set	not set
Bupirimate	1 (A)	not set	Not set	not set	0.2 (A,P)	Not set	not set	0.8 (A), 0.5 (P)	not set	not set	not set
Buprofezin	0.2(P)	3 (A), 6 (P)	3(A) 6 (P)	not set	3 (A) 0.5 (P)	3 (A), 6 (P)	3 (A) 6 (P)	3 (A) 6 (P)	not set	not set	not set
Captan	10	15	5	15	10 ^b	15	not set	5 (A), 25 (P)	not set	25	not set

^a EU MRL proposal of *0.01 mg/kg G/SPS/N/EU/161/Add.1

^b EU residue definition changed to Captan (Sum of captan and THPI, expressed as captan). Approval of the active will expire on 31 July 2018.

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Active ingredient ¹	Australia ²	Codex ⁴	Canada ³	China	European Union ⁵	Hong Kong ¹²	Indonesia ⁶	Japan ⁷	Malaysia ⁸	Singapore ⁹	Thailand
Carbaryl	0.2 ^c	not set	5	not set	*0.01	12	not set	1 (A), 5 (P)	not set	5	not set
Carfentrazone	*0.05	not set	0.1	not set	*0.01	0.1	not set	0.1	not set	not set	not set
Chlorantraniliprole	0.3	0.4	0.4	2 (A) 0.4 (P)	0.5	1.2	not set	1	not set	not set	not set
Chlorfenapyr	0.5	not set	not set	not set	*0.01	Not set	not set	2 (A), 1 (P)	not set	not set	not set
Chlorpyrifos	T0.5	1	0.01 (A)	1	*0.01	1	not set	1 (A), 0.5 (P)	not set	1.0 (A), 0.5 (P)	not set
Clofentezine	0.1	0.5	0.5	0.5	0.5	0.5	not set	1 (A), 0.5 (P)	not set	not set	not set
Clothianidin	T2	0.4	0.3	not set	0.4	Not set	not set	1	not set	not set	not set
Copper	10	not set	not set	not set	5		not set	Not required	not set	not set	not set
Cyanamide	*0.02 (A) *0.1 (P ^b)	not set	not set	not set	*0.01	Not set	not set	not set	not set	not set	not set
Cypermethrins	1	0.7	1 (A), 0.5 (P)	2	1	2	not set	2	2	2	0.02
Cyprodinil	0.05	2	1.7	1(P)	2	1.7	0.05 (A) 1 (P)	5	not set	not set	not set
Diazinon	0.5	0.3	0.75	0.3	*0.01	0.5	not set	0.1	not set	0.5	not set
Dicofol	5	not set	3	1	*0.02	1	not set	3	not set	5	not set
Difenoconazole	0.3	0.8	5	0.5	0.8	1	not set	0.8	not set	not set	not set
Diphenylamine	10 (A), 7 (P)	10 (A), 5 (P)	5 (A)	5	0.1	10 (A) 7 (P)	10 (A), 5 (P)	10 (A), 5 (P)	not set	5	not set
Diquat	*0.05	*0.02	0.02	0.1 (A)	0.02	Not set	not set	0.03	not set	not set	not set

^c APVMA Control of Use MRL, FSANZ Food Code MRL set at 5 mg/kg

^d Nashi pear

Apple and Pear Maximum Residue Limits – February 2017

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Active ingredient ¹	Australia ²	Codex ⁴	Canada ³	China	European Union ⁵	Hong Kong ¹²	Indonesia ⁶	Japan ⁷	Malaysia ⁸	Singapore ⁹	Thailand
Dithianon	2	1	not set	5 (A) 2 (P)	3	5	not set	2 (A) 5 (P)	not set	not set	not set
Dodine	5	5	5	5 ^e	0.9	5	not set	5	not set	5	not set
Ethephon	1 (A)	0.8 (A)	3 (A)	5(A)	0.6 (A), *0.05 (P)	5 (A)	5 (A)	5 (A), 3 (P)	not set	not set	1 (A)
Etoxazole	0.2	0.07	0.2	not set	0.07	0.2	not set	0.5	not set	not set	not set
Fenarimol	0.2	0.3	not set	0.3	0.1	0.3	not set	1	not set	not set	not set
Fenbutatin oxide	3	5	3	5	2	15	not set	5	not set	5	not set
Fenitrothion	1	0.5 (A)	not set	0.5	*0.01	0.5	0.5 (A)	0.2	not set	2.0 (A), 0.5 (P)	not set
Fenoxycarb	2	not set	not set	not set	1	Not set	not set	2	not set	not set	not set
Fenpyroximate	0.3	0.3	0.3	0.3(A)	0.3	0.3	not set	0.5 (A), 1 (P)	not set	not set	not set
Fonicamid	0.7 (A)	0.8 ^f	0.2	1(A) ^g	0.3	0.2	not set	1(A) 0.5 (P)	not set	not set	not set
Fluazifop-P	*0.01	*0.01 ^e	not set	not set	*0.01	Not set	not set	0.1	not set	not set	not set
Fluazinam	*0.01	not set	2 (A)	not set	0.3 (A) *0.05 (P)	2 (A), 0.5 (P)	not set	0.5	not set	not set	not set
Fludioxonil	5	5	5	not set	5	5 (A) 0.7 (P)	not set	5	not set	not set	not set
Fluopyram	0.5	0.5	0.8	not set	0.6 (A) 0.5 (P)	Not set	not set	1 (A) 3 (P)			not set
Fluquinconazole	0.3	not set	not set	not set	0.1 (A), 0.2 (P)	Not set	not set	0.05	not set	not set	not set

^e The limit is temporary

^f MRL Recommendation to be considered by 2017 Codex Committee on Pesticide Residues

^g The limit is temporary

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Active ingredient ¹	Australia ²	Codex ⁴	Canada ³	China	European Union ⁵	Hong Kong ¹²	Indonesia ⁶	Japan ⁷	Malaysia ⁸	Singapore ⁹	Thailand
Fluvalinate	0.1 (A)	not set	not set	not set	0.3	Not set	not set	0.5 (A), 2 (P)	not set	not set	not set
Fosetyl	1 (A)	not set	1 (A)	30 (A)	75	10	not set	75 (A), 50 (P)	not set	not set	not set
Gibberellins	not required	not set	not set	not set	not required ^h	not set	not set	0.2	not set	not set	not set
Glufosinate	*0.1	0.1	0.2	not set	0.1	0.05	not set	0.2 (A) 0.1(P)	not set	not set	not set
Glyphosate	*0.05	not set	not set	0.5 (A) 0.1 (P)	*0.1	0.5 (A) 0.2 (P)	not set	0.2	not set	not set	not set
Haloxypop-R	*0.05	0.02	not set	0.02	*0.01	0.02	not set	0.05	not set	not set	not set
Hexaconazole	0.1	not set	not set	0.5	*0.01	Not set	not set	0.5	not set	not set	not set
Hexythiazox	1	0.4	0.4	0.5	1	0.5 (A) 1 (P)	not set	1	not set	not set	not set
Imazalil	5	5	not set	5	2	5	not set	5	not set	not set	not set
Imidacloprid	0.3 (A)	0.5 (A), 1 (P)	0.6	0.5 (A)	0.5	0.5 (A) 1 (P)	0.5 (A), 1 (P)	0.5 (A), 0.7 (P)	not set	not set	not set
Indoxacarb	2	0.5 (A), 0.2 (P)	not set	not set	0.5	1 (A) 2 (P)	0.5 (A) 0.2 (P)	0.5 (A) 0.2 (P)	not set	not set	not set
Iprodione	3	5	not set	5	6	5	not set	10	not set	10	not set
Isoxaben	*0.01	not set	not set	not set	0.05	Not set	not set	not set	not set	not set	not set
Kresoxim-methyl	0.1	0.2	0.5	0.2 (A)	0.2	0.2	not set	5	not set	not set	not set
Malathion	2 (A), 0.5 (P)	0.5 (A)	2	2	*0.02	8	0.5 (A), 0.5 (P)	0.5	not set	2.0 (A)	not set
Mancozeb	3	5	7	5	5	7 (A), 10(P)	not set	5	not set	3	not set
Metalddehyde	1	not set	not set	not set	*0.05	Not set	not set	0.01	1	not set	not set

^h EU MRL of 5 mg/kg for Gibberellic acid

Apple and Pear Maximum Residue Limits – February 2017

The information contained in this document is provided as guidance as an aid to help ensure compliance with maximum residue limits (MRLs) in countries, as listed, to which citrus fruit are exported.

However, No absolute guarantee can be given that export MRLs will not be exceeded in all instances. It is therefore strongly recommended that this information be used in conjunction with residue monitoring to avoid violative residues.

Active ingredient ¹	Australia ²	Codex ⁴	Canada ³	China	European Union ⁵	Hong Kong ¹²	Indonesia ⁶	Japan ⁷	Malaysia ⁸	Singapore ⁹	Thailand
methidathion	0.2	0.5 (A), 1 (P)	0.5	0.05	0.03	0.5 (A) 1 (P)	0.5 (A) 1(P)	0.5 (A), 1 (P)	not set	0.2	0.1 (A) 0.2 (P)
Methomyl	1 (A), 3 (P)	0.3	0.5 (A) ⁱ	0.2	*0.02	2 (A) 0.3 (P)	0.3	3	not set	5 (A)	0.3
Methoxyfenozide	0.5	2	1.5	3(A)	2	3 (A) 2 (P)	not set	2	not set	not set	not set
Metiram	3	5	7	Not set	5	7 (A), 10(P)	not set	5	not set	3	not set
Milbemectin	0.03	not set	not set	not set	*0.02	not set	not set	0.2	not set	not set	not set
Myclobutanil	0.5	0.6	0.5	0.5	0.6	0.5	not set	0.5 (A), 0.7 (P)	not set	not set	not set
NAA	1	not set	not set	0.1(A)	1	0.15	not set	0.5 (A), 0.3 (P)	not set	not set	not set
Norflurazon	*0.2	not set	not set	not set	not set	0.1	not set	0.1	0.1	not set	not set
Novaluron	T1	3	2	3	2 (A) 3 (P)	3	not set	3	not set	not set	not set
Oryzalin	0.1	not set	not set	not set	*0.01	0.05	not set	0.08	not set	not set	not set
Oxyfluorfen	0.05	not set	not set	not set	0.1	0.05	not set	0.05	not set	not set	not set
Pacllobutrazol	1	not set	not set	0.5(A)	0.5	0.5 (A) 1 (P)	not set	0.5 (A), 1 (P)	not set	not set	not set
Paraquat	*0.05	*0.01	0.05	0.05(A) 0.01 (P) ^j	*0.02	0.05	not set	0.05	not set	not set	not set
Penconazole	0.1	0.2	not set	0.2	0.2	0.2	not set	0.2	not set	not set	not set
Penthiopyrad	0.5	0.4	0.5	not set	0.5	Not set	not set	2 (A), 3 (P)	not set	not set	not set
Piperonyl butoxide	8	not set	8	not set	not set	8	not set	8	not set	8	not set

ⁱ Proposed for revocation in Canada

^j The limit is temporary

Apple and Pear Maximum Residue Limits – February 2017

The information contained in this document is provided as guidance as an aid to help ensure compliance with maximum residue limits (MRLs) in countries, as listed, to which citrus fruit are exported.

However, No absolute guarantee can be given that export MRLs will not be exceeded in all instances. It is therefore strongly recommended that this information be used in conjunction with residue monitoring to avoid violative residues.

Active ingredient ¹	Australia ²	Codex ⁴	Canada ³	China	European Union ⁵	Hong Kong ¹²	Indonesia ⁶	Japan ⁷	Malaysia ⁸	Singapore ⁹	Thailand
Pirimicarb	0.5	1	0.5 (A)	1	0.5	1	not set	1	not set	1	not set
Prohexadione calcium	*0.02 (A)	not set	3 (A)	not set	0.1	3	not set	2	not set	not set	not set
Propargite	3	3.0 (A)	3 (A)	5	*0.01	5	3	5 (A)	not set	3	not set
prothiofos	0.05	not set	not set	not set	not set	Not set	not set	0.3 (A), 0.1 (P)	not set	not set	not set
pyraclostrobin	1	0.5(A)	1.5	0.5 (A)	0.5	0.5 (A) 1.5 (P)	0.5 (A)	1 (A), 2 (P)	not set	not set	not set
Pyrethrins	1	not set	1		1	1	not set	1	not required	1	not set
Pyridaben	0.5	not set	0.5 (A), 0.75 (P)	2 (A)	0.5	0.5 (A) 0.75 (P)	not set	1	not set	not set	not set
Pyrimethanil	7 ^k	15	14	7(A) 1(P)	15	14	not set	14	not set	not set	not set
Saflufenacil	*0.03	0.01	0.03	not set	*0.03	Not set	not set	0.03	0.01	not set	not set
Spinetoram	0.1	0.05	0.2	not set	0.2	0.05	not set	0.5	not set	not set	not set
Spinosad	0.5	0.1 (A)	0.2	0.1(A)	0.3	0.2 (A) 0.5(P)	0.1 (A)	0.5	not set	not set	not set
Spirotetramat	0.5	0.7	0.7	0.7	1	0.7	not set	0.7	not set	not set	not set
Sulfoxaflor	0.5	0.3	0.5	not set	0.4	Not set	not set	not set	not set	not set	not set
Sulphur	Not required	not set	not set	not set	Not required		not set	Not required	not set	not set	not set
Tebuconazole	*0.01	1	0.1	not set	0.3	0.5	1	1 (A) 5(P)	not set	not set	not set
Tebufenozide	1	1	1	1	1	1 (A) 1.5 (P)	not set	1	not set	not set	not set
Tebufenpyrad	1	not set	not set	not set	0.2	Not set	not set	0.5	not set	not set	not set
Tetradifon	5	not set	5	2(A)	*0.01	Not set	not set	1	not set	not set	not set
Thiabendazole	10	3	10	3	5	3	not set	3	not set	10	0.1

^k FSANZ Food Code MRL. APVMA Control of Use MRL is set at T15 mg/kg

Apple and Pear Maximum Residue Limits – February 2017

The information contained in this document is provided as guidance as an aid to help ensure compliance with maximum residue limits (MRLs) in countries, as listed, to which citrus fruit are exported.

However, No absolute guarantee can be given that export MRLs will not be exceeded in all instances. It is therefore strongly recommended that this information be used in conjunction with residue monitoring to avoid violative residues.

Active ingredient ¹	Australia ²	Codex ⁴	Canada ³	China	European Union ⁵	Hong Kong ¹²	Indonesia ⁶	Japan ⁷	Malaysia ⁸	Singapore ⁹	Thailand
Thiacloprid	1	0.7	0.3	0.7	0.3	0.7 (A) 1 (P)	not set	2	not set	not set	not set
Thiram	3	5	7	5(A)	5	7 (A), 10(P)	not set	5	not set	3	not set
Triadimefon	1 (A)	0.3(A)	not set	1(A) 0.5 (P)	*0.2 (A), *0.1 (P)	0.3 (A)	0.3	0.5	not set	0.5	not set
trichlorfon	T0.1	not set	not set	0.2	*0.01	0.1	not set	2 (A), 0.5 (P)	not set	0.1	not set
Trifloxystrobin	0.3	0.7	0.5	0.7(A)	0.7	0.7	not set	3 (A), 5 (P)	not set	not set	not set
Triforine	1	not set	not set	2 (A)	*0.01	2 (A)	2 (A)	2	not set	2 (A)	not set
Ziram	3	5	7	5(A)	5	7 (A), 10(P)	not set	5	not set	7	not set

Apple and Pear Maximum Residue Limits – February 2017

The information contained in this document is provided as guidance as an aid to help ensure compliance with maximum residue limits (MRLs) in countries, as listed, to which citrus fruit are exported. However, No absolute guarantee can be given that export MRLs will not be exceeded in all instances. It is therefore strongly recommended that this information be used in conjunction with residue monitoring to avoid violative residues.

Notes

- ¹ The registration status of the chemicals listed may vary for each commodity and in each State. Prior to using any chemical, consult the label and/or regulatory authority in your State. The persistent organochlorines (DDT, dieldrin and lindane) are not registered for use. This table does not include many herbicides, pheromones and other solvents which are registered for use as they are considered to be at low risk of causing unacceptable residues in apples and pears
- ² AUSTRALIA: in the absence of a set MRL, zero tolerance applies.
- ³ CANADA The General MRL applies to foods that contain residues of agricultural chemicals (including pesticides) unless a specific MRL has been established. Regulation B.15.002(1) of the FDR establishes 0.1 ppm as the “General Maximum Residue Limit”.
- ⁴ Many countries default to maximum residue limits established by CODEX in the absence of a domestic MRL.
- ⁵ EUROPEAN UNION: Has a default value of 0.01 mg/kg in the event of no MRLs listed.
- ⁶ INDONESIA: PERATURAN MENTERI PERTANIAN REPUBLIK INDONESIA NOMOR 55/Permentan/KR.040/11/2016. May reference Codex if there is no national MRL.
- ⁷ JAPAN - has set a general limit if there is no MRL set indicating the amount unlikely to cause damage to human health that the provision of Paragraph 3, Article 11 of the Food Sanitation Law requires the Minister to set is 0.01 ppm.
- ⁸ MALAYSIA: For those values listed as ‘not set’, refer to the corresponding Codex value. If no Codex MRL exists a default MRL of 0.01 mg/kg then applies.(Regulation 41).
- ⁹ SINGAPORE: In the absence of a set MRL, default to the Codex level.
- ¹⁰ THAILAND: As per THAI Agricultural Standard TAS 9002-2016. Reference Codex if there is no national MRL. If no Codex MRL default of 0.01 mg/kg applied.
- ¹¹ * MRL or EMRL is set at or about the limit of quantitation
- ¹² Hong Kong - The Pesticide Residues in Food Regulation (Cap. 132CM) came into operation on 1 August 2014.
- ¹³ China MRL as contained in GB 2763-2016 National Food Safety Standard, which is understood to come into effect June 2017.

Apple and Pear Maximum Residue Limits – February 2017

'A' Apple

'P' Pear

Otherwise refers to both.

'not set' denotes that no MRL has been established, refer to details above for each countries default value.

'NR - not required' denotes that no MRL has been established, and any detection is permissible.

'T' denotes that the MRL residue definition or use is temporary to enable further experimental work to be carried out in Australia or overseas, and will be reconsidered at some further date. This symbol is also used in cases where the MRL is being phased out.

'E' Extraneous MRL (Australia) means the maximum permitted limit of a pesticide residue, arising from environmental sources other than the use of a pesticide directly or indirectly on the food, expressed in milligrams of the chemical per kilogram of the food (mg/kg).

This table has been compiled with reference to the information obtained from the following Food/Agricultural Authorities or publications:

Australia - Australian Pesticides and Veterinary Medicines Authority (APVMA), FSANZ.

Canada - List of Maximum Residue Limits Regulated Under the Pest Control Canadian MRLs.

Codex - Codex Alimentarius Commission. FAO/WHO Food Standards Codex Alimentarius Pesticide Residues in Food - MRLs & Extraneous MRLs.

European Union - The EU pesticide residues database provides for a search tool for all the EU-MRLs set in Reg. (EC) No 396/2005. Updated 7/02/2017.

Hong Kong – Hong Kong Centre for Food Safety.

Indonesia - Maximum Limits of Pesticide Residues in Agricultural Products - NOMOR 55/Permentan/KR.040/11/2016.

Japan - Positive List System for Agricultural Chemical Residues in Foods

Malaysia - Laws of Malaysia. Food (Amendment) Regulations 2004 available on the Ministry of Health Food Safety and Quality Division.

THAI Agricultural Standard TAS 9002-2016.

10.3.4 Agrichemical WHPs for apples in overseas markets

Guide to Achieving Apple & Pear Export MRLs - February 2017

1. The information contained in this document is provided only as a guide to assist industry members in complying with maximum residue limits (MRLs) in respect of apples in the listed countries. The data must not be relied upon as being true and accurate data.
2. APAL will use all reasonable endeavours to review and amend the data contained in this document from time to time in accordance with information obtained from domestic and international regulatory authorities and agrochemical companies. However, the actual specified MRLs and export withholding period for each country is subject to change from time to time. Actual MRLs must be independently verified before the export of apples.
3. It is strongly recommended that the information contained in this document be used in conjunction with residue monitoring to ensure compliance with actual MRLs.
4. Growers should maintain accurate and detailed records of all chemicals applied to fruit. It is strongly recommended that farmers consult product labels before application as State and/or Territory requirements may vary from time to time.
5. Herbicide details have not been included, as contact with fruit should not occur during herbicide application.
6. MRLs for various export destinations MRL tables can be found at <http://www.apal.org.au/>

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To the extent permitted by law, APAL does not accept responsibility for any person acting or relying upon the information contained in this document and APAL will not be liable to any person for any loss or damage arising as a result of a person acting or refraining from acting in reliance on any information contained in this document.

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LEGEND

Food Standards Australia New Zealand (FSANZ) MRLs are used as the default Australian MRL unless otherwise indicated.

Signifies that an Australian Pesticides & Veterinary Medicines Authority (APVMA) MRL has been used in the absence of a FSANZ MRL

* Signifies an MRL set at the limit of quantitation (LOQ)

NR - Indicates that a withholding period is not required when used as directed

Canada - List of Maximum Residue Limits Regulated Under the Pest Control Canadian MRLs. In the absence of a set MRL, a default MRL of 0.1 mg/kg applies.

China - MRLs indicated based upon unofficial translation of GB 2763-2016, to be applied from June 2017 and WTO SPS Notifications 1051 and 1053.

Care needs to be taken as translation of commodity names can be problematic.

Codex - Codex Alimentarius Commission. FAO/WHO Food Standards Codex Alimentarius Pesticide Residues in Food - MRLs & Extraneous MRLs

European Union - The EU pesticide residues database provides for a search tool for all the EU-MRLs set in Reg. (EC) No 396/2005. Updated 7/02/2017

Hong Kong - Hong Kong Centre for Food Safety- The Pesticide Residues in Food Regulation (Cap. 132CM) ("the Regulation")

Indonesia - Maximum Limits of Pesticide Residues in Agricultural Products - NOMOR 55/Permentan/KR.040/11/2016.

Japan - Positive List System for Agricultural Chemical Residues in Foods

Malaysia - Laws of Malaysia. Food (Amendment) Regulations 2004 available on the Ministry of Health Food Safety and Quality Division. In the absence of a set domestic MRL, Codex MRLs may apply, in the absence of a Codex MRL a maximum residue limit of 0.01 mg/kg applies.

Singapore - In the absence of a nationally set MRL, default to the Codex level (MRLs as per S493/2013 wef 01/08/2013])

Thailand - THAI Agricultural Standard TAS 9002-2016 (December 2016). In the absence of a national standard Codex MRLs may apply

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Insecticides:

Active ingredient (Example of Common product)	Aust WHP (days)	Codex	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
abamectin (Vertimec)	14	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days
alpha-cypermethrin (Fastac)	14	Do not use post-flowering	Export WHP - 35 days (A only)	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Do not use post-flowering	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Do not use post-flowering
azinphos-methyl (Gusathion)	14	Do not use post-flowering.	Export WHP - 14 days	Export WHP - 14 days	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering	Do not use post-flowering.	Export WHP - 14 days	Export WHP - 28 days.	Do not use post-flowering
bifenazate (Acramite)	7	Export WHP - 90 days.	Export WHP - 90 days	Export WHP - 90 days	Export WHP - 90 days	Do not use post-flowering	Do not use post-flowering	Export WHP 7 days	Export WHP - 90 days	Export WHP - 90 days	Export WHP - 90 days
bifenthrin (Talstar)	NS	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering	Do not use post-flowering.	Do not use post-flowering	Do not use post-flowering	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering
buprofezin (Applaud)	56	Export WHP 56 days	Export WHP 56 days	Not MRL set	Export WHP 56 days	Export WHP 56 days	Not MRL set	Export WHP 56 days	Export WHP 56 days	Export WHP 56 days	Export WHP 56 days
carbaryl (Bugmaster)	77	Export WHP 110 days.	Export WHP 77 days.	Export WHP 110 days.	Export WHP 110 days.	Export WHP 77 days.	Export WHP 110 days.	Export WHP 77 days.	Export WHP 110 days.	Export WHP 77 days.	Export WHP 110 days.
chlorantraniliprole (Altacor)	14	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days	Export WHP - 14 days.	Not MRL set	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days

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Export MRLs Guide February 2017

Insecticides:

Active ingredient (Example of Common product)	Aust WHP (days)	Codex	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
chlorfenapyr (Secure)	14	Do not use.	Do not use.	Do not use	Do not use.	Do not use	Do not use	Export WHP - 14 days	Do not use.	Do not use.	Do not use
chlorpyrifos (Lorsban)	14	Export WHP 14 days.	Do not use post-flowering.	Export WHP 14 days.	Do Not use post-flowering	Export WHP - 14 days.	Not MRL set	Export WHP 14 days.	Export WHP 14 days.	Export WHP - 14 days.	Export WHP 14 days.
clofentezine (Apollo)	21	Export WHP 21 days.	Export WHP 21 days.	Export WHP 21 days.	Export WHP 21 days.	Export WHP - 21 days	Not MRL set	Export WHP 21 days.	Export WHP 21 days.	Export WHP - 21 days.	Export WHP 21 days.
clothianidin (Samurai)	21	Export WHP 70 days.	Export WHP 70 days.	Do not use	Export WHP 70 days.	Export WHP 70 days	Not MRL set	Export WHP 70 days.	Export WHP 70 days.	Export WHP 70 days.	Export WHP 70 days.
diazinon (Diazinon)	14	Export WHP 35 days.	Export WHP 14 days.	Export WHP 35 days.	Do not use post-flowering	Export WHP - 14 days.	Not MRL set	Export WHP - 42 days	Export WHP 35 days. .	Export WHP - 14 days.	Export WHP 35 days.
dicofol (Kelthane)	7	Do not use post-flowering.	Export WHP 35 days.	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering	Do not use post-flowering.	Export WHP 35 days.	Do not use post-flowering.	Export WHP - 7 days.	Do not use post-flowering.
etoxazole (Paramite)	21	Export WHP 56 days.	Export WHP 21 days.	Do not use post-flowering	Export WHP 56 days.	Export WHP 21 days	Not MRL set	Export WHP 21 days.	Export WHP 56 days.	Export WHP - 56 days.	Export WHP 56 days.
fenbutatin oxide (Torque)	2	Export WHP 2 days.	Export WHP 2 days.	Export WHP 2 days.	Export WHP - 28 days.	Export WHP 2 days	Not MRL set	Export WHP 2 days.	Export WHP 2 days.	Export WHP 2 days.	Export WHP 2 days.
fenoxycarb (Insegar)	14	Do not use post-flowering.	Do not use post flowering.	Do not use post flowering	Export WHP 42 days	Do not use post-flowering	Not MRL set	Export WHP 42 days	Do not use post flowering.	Do not use post-flowering.	Do not use post flowering

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Export MRLs Guide February 2017

Insecticides:

Active ingredient (Example of Common product)	Aust WHP (days)	Codex	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
fluvalinate (tau) (Mavrik)	NR	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering.	NR (A)	Do not use post-flowering.	Do not use post-flowering.	NR (A)	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering.
hexythiazox (Calibre)	3	Export WHP 42 days	Export WHP 42 days	Export WHP 42 days	Export WHP 3 days	Export WHP 3 days (P) Export WHP 42 days (A)	Not MRL set	Export WHP 3 days	Export WHP 42 days	Export WHP 42 days	Export WHP 42 days
imidacloprid (Confidor)	NS	NR if used as dormant treatment	NR if used as dormant treatment	NR if used as dormant treatment	NR if used as dormant treatment	NR if used as dormant treatment	NR if used as dormant treatment	NR if used as dormant treatment	NR if used as dormant treatment	NR if used as dormant treatment	NR if used as dormant treatment
indoxacarb (Avatar)	14	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering (A) Export WHP 14 days (P)	Not MRL set	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering.
maldison (Maldison, Malathion)	3	Export WHP 28 days.	Export WHP 3 days.	Export WHP 3 days	Do not use post-flowering.	Export WHP 3 days.	Export WHP 42 days (A) Export WHP 28 days. (P)	Export WHP 28 days.	Export WHP 28 days.	Export WHP 3 days.	Export WHP 28 days.
methidathion (Suprathion)	14	Export WHP - 14 days.	Export WHP - 14 days.	Do not use post-flowering	Do not use post-flowering.	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days.(P) Do not use post-flowering. (A)
methomyl (Lannate)	1	Do not use post-flowering.	Do not use post-flowering..	Do not use post-flowering.	Do not use post-flowering.	Export WHP 1 days (A) Do not use post-flowering.(P)	Do not use post-flowering.	Export WHP 1 days.	Do not use post-flowering.	Export WHP 1 days. (A)	Do not use post-flowering.
methoxyfenozide (Prodigy)	14	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days	Not MRL set	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days.	Export WHP - 14 days.

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Export MRLs Guide February 2017

Insecticides:

Active ingredient (Example of Common product)	Aust WHP (days)	Codex	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
pirimicarb (Pirimor)	2	Export WHP 2 days.	Export WHP 2 days. (A)	Export WHP 2 days.	Export WHP 2 days.	Export WHP 2 days.	Not MRL set	Export WHP 2 days.	Export WHP 2 days.	Export WHP 2 days.	Export WHP 2 days.
propargite (Omite)	7	Export WHP 7 days. (A)	Export WHP 7 days. (A)	Export WHP 7 days.	Export WHP 84 days.	Export WHP 7 days.	Export WHP 7 days.	Export WHP 7 days (A)	Export WHP 7 days.	Export WHP 7 days.	Export WHP 7 days.
prothiofos (Tokuthion)	56	Do not use post-flowering	Do not use post-flowering	Do not use post-flowering	Do not use post-flowering	Do not use post-flowering	Not MRL set	Do not use post-flowering	Do not use post-flowering	Do not use post-flowering	Do not use post-flowering
pyridaben (Sanmite)	1	Do not use post-flowering.	Export WHP 1 days.	Export WHP 1 days.(A) Do not use post-flowering (P)	Export WHP 1 day.	Export WHP 1 day.	Not MRL set	Export WHP 1 days.	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering
spinetoram (Delegate)	7	Export WHP 14 days.	Export WHP 7 days.	Do not use post-flowering	Export WHP 7 days.	Export WHP 14 days	Not MRL set	Export WHP 7 days.	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days.
spinosad (Success)	3	Export WHP 21 days (A)	Export WHP 7 days.	Export WHP 21 days (A)	Export WHP 3 days.	Export WHP 21 days.	Do not use post-flowering	Export WHP 3 days.	Export WHP 21 days(A).	Export WHP 21 days(A).	Export WHP 21 days(A)
spirotetramat	14	Export WHP 14 days.	Export WHP 14 days	Export WHP 14 days	Export WHP 14 days	Export WHP 14 days	Not MRL set	Export WHP 14 days	Export WHP 14 days	Export WHP 14 days	Export WHP 14 days
Sulfoxaflor (Transfom)	3	Export WHP 21 days	Export WHP 3 days.	Do not use on export fruit	Do not use on export fruit	Do not use on export fruit	Not MRL set	Do not use on export fruit	Export WHP 21 days	Export WHP 21 days	Export WHP 21 days

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Insecticides:

Active ingredient (Example of Common product)	Aust WHP (days)	Codex	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
tebufenozide (Mimic)	21	Export WHP 21 days.	Export WHP 21 days.	Export WHP 21 days	Export WHP 21 days	Export WHP 21 days	Do not use post-flowering	Export WHP 21 days.	Export WHP 21 days.	Export WHP 21 days.	Export WHP 21 days
tebufenpyrad (Pyranica)	14	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering	Do not use post-flowering.	Do not use post-flowering	Do not use post-flowering	Do not use post-flowering	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering
thiacloprid (Calypso)	14	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering	Do not use post-flowering.	Do not use post-flowering (A) Export WHP 14 days (P)	Not MRL set	Export WHP 14 days.	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering
trichlorfon (Dipterex)	2	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering	Do not use post-flowering	Export WHP 2 days.(A)	Do not use post-flowering	Export WHP 2 days	Do not use post-flowering.	Export WHP 2 days (A)	Do not use post-flowering

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Export MRLs Guide February 2017

Fungicides:

Active ingredient (Example of Common product)	Aust WHP (days)	Codex	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
boscalid (Pristine)	28	Export WHP 28 days (A) only	Export WHP 28 days.	Export WHP 28 days (A) only	Export WHP 28 days (A) Export WHP 42 days (P)	Export WHP 28 days	Export WHP 28 days (A only) Do not use post-flowering (P)	Export WHP 28 days	Export WHP 28 days (A) only	Export WHP 28 days (A) only	Export WHP 28 days (A) only
bupirimate (Nimrod)	7	Do not use.	Do not use	Do not use	Do not use	Do not use	Not MRL set	Export WHP 21 days.	Do not use	Do not use	Do not use
captan (Captan)	7	Export WHP 7 days	Export WHP 21 days	Export WHP 7 days	Export WHP 35 days	Export WHP 7 days	Not MRL set	Export WHP 28 days	Export WHP 7 days	Export WHP 7 days	Export WHP 7 days
cyprodinil (Chorus)	Do not use post petal fall.	Do not use post petal fall.	Do not use post petal fall.	Do not use post petal fall.	Do not use post petal fall.	Do not use post petal fall.	Do not use post petal fall.	Do not use post petal fall.	Do not use post petal fall.	Do not use post petal fall.	Do not use post petal fall.
difenoconazole (Bogard)	28	Export WHP 28 days	Export WHP 28 days	Export WHP 28 days	Export WHP 28 days	Export WHP 28 days	Not MRL set	Export WHP 28 days	Export WHP 28 days	Export WHP 28 days	Export WHP 28 days
dithianon (Delan)	21	Do not use post-flowering.	Do not use post-flowering.	Export WHP 21 days	Export WHP 21 days	Export WHP 21 days	Not MRL set	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering.	Do not use post-flowering.
dodine acetate (Syllit)	5	Export WHP 5 days	Export WHP 5 days	Export WHP 5 days*	Do not use post-flowering.	Export WHP 5 days	Not MRL set	Export WHP 5 days	Export WHP 5 days	Export WHP 5 days	Export WHP 5 days

* The MRL is indicated as temporary

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Fungicides:

Active ingredient (Example of Common product)	Aust WHP (days)	Codex	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
fenarimol (Rubigan)	14	Export WHP 14 days.	Do not use post-flowering.	Export WHP 14 days.	Do not use post-flowering.	Export WHP 14 days	Not MRL set.	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days.
fluazinam	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
fludioxonil (Scholar)	NR	NR	NR	Do not use	NR	NR (A) Do not use (P)	No MRL set	NR	NR	NR	NR
fluopyram	28	Export WHP 28 days.	Export WHP 28 days.	Do not use	Export WHP 28 days.	Do not use	No MRL set	Export WHP 28 days.	Export WHP 28 days.	Export WHP 28 days.	Export WHP 28 days.
fluquinconazole (Vision)	Do not use post- petal fall.	Do not use	Do not use	Do not use	Do not use	Do not use	No MRL set	Do not	Do not use	Do not use	Do not use
fosetyl-Al (Aliette)	14	Do not use	Do not use post-flowering.	Export WHP 14 days (A only)	Export WHP 14 days.	Export WHP 14 days	No MRL set	Export WHP 14 days.	Do not use	Do not use	Do not use
hexaconazole (Viva)	7	Do not use	Do not use	Do not use	Do not use	Do not use	No MRL set	Export WHP 7 days	Do not use	Do not use	Do not use
imazalil Post Harvest (Fungaflor)	NS	NR	Do not use	NR	Do not use	NR	No MRL set	NR	NR	NR	NR

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Export MRLs Guide February 2017

Fungicides:

Active ingredient (Example of Common product)	Aust WHP (days)	Codex	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
iprodione <i>Post Harvest</i> (Rovral)	Nil	NR	Do not use	NR	NR	NR	No MRL set	NR	NR	NR	NR
kresoxim methyl (Stroby)	42	Export WHP 42 days	Export WHP 42 days	Export WHP 42 days (A only)	Export WHP 42 days	Export WHP 42 days	No MRL set	Export WHP 42 days	Export WHP 42 days	Export WHP 42 days.	Export WHP 42 days
mancozeb (Mancozeb)	14	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days	Not MRL set	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days.
metiram (Polyram)	21	Export WHP 21 days	Export WHP 21 days	Do not use	Export WHP 21 days	Export WHP 14 days	No MRL set	Export WHP 21 days	Export WHP 21 days	Export WHP 21 days	Export WHP 21 days
myclobutanil (Systhane)	21	Export WHP 21 days	Export WHP 21 days	Export WHP 21 days	Export WHP 21 days	Export WHP 21 days	No MRL set	Export WHP 21 days	Export WHP 21 days	Export WHP 21 days.	Export WHP 21 days.
penconazole (Topas)	14	Export WHP 14 days.	Export WHP 35 days.	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days.	No MRL set	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days.	Export WHP 14 days.
Penthiopyrad (Fontelis)	28	Export WHP 42 days	Export WHP 28 days	No MRL	Export WHP 42 days	No MRL	No MRL set	Export WHP 42 days	Export WHP 42 days	Export WHP 42 days	Export WHP 42 days
pyraclostrobin (Pristine)	28	Export WHP 42 days (A only)	Export WHP 28 days	Export WHP 42 days (A only)	Export WHP 42 days	Export WHP 42 days (A) Export WHP 28 days (P)	Export WHP 42 days (A only)	Export WHP 28 days	Export WHP 42 days (A only)	Export WHP 42 days (A only)	Export WHP 42 days (A only)

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Export MRLs Guide February 2017

Fungicides:

Active ingredient (Example of Common product)	Aust WHP (days)	Codex	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
pyrimethanil Post Harvest (Philabuster)	NR.	NR	NR	NR (A) Do not use (P)	NR	NR	No MRL set	NR	NR	NR	NR
Tebuconazole (Greenseal Pruning wound dressing)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
thiabendazole Post Harvest (Tecto)	NR	Do not use	NR	Do not use	Do not use	Do not use	Do not use	Do not use	Do not use	NR	Do not use
thiram (Thiragranz)	7	Export WHP 7 days	Export WHP 7 days	Export WHP 7 days (A only)	Export WHP 14 days	Export WHP 7 days	No MRL set	Export WHP 7 days	Export WHP 7 days	Export WHP 7 days	Export WHP 7 days
trifloxystrobin (Flint)	35	Export WHP 35 days	Export WHP 35 days	Export WHP 35 days (A only)	Export WHP 35 days	Export WHP 35 days	No MRL set	Export WHP 35 days	Export WHP 35 days	Export WHP 35 days	Export WHP 35 days
triforine (Saprol)	1	Do not use	Do not use	Export WHP 1 day (A only)	Do not use	Export WHP 1 day (A only)	Export WHP 1 day (A only)	Export WHP 1 day	Do not use	Export WHP 1 day (A only)	Do not use
ziram (Ziram, Fulasin)	7	Export WHP 7 days	Export WHP 7 days	Export WHP 7 days (A only)	Export WHP 14 days	Export WHP 7 days	No MRL set	Export WHP 7 days.	Export WHP 7 days	Export WHP 7 days	Export WHP 7 days

NR - Not Required NS - Not Set

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Export MRLs Guide February 2017

Growth Regulators:

Active ingredient (Example of Common product)	Aust WHP (days)	Codex (Hong Kong)	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
ammonium thiosulfate (Thin-It)	NR	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice
aviglycine (Retain)	7	No information. Seek manufacturer advice	Export WHP 14 days	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	Export WHP 7 days	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice
6-benzyladenine (CyLex)	NR	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice
cyanamide (Dormex)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
diphenylamine (DPA)	NS	NR (A) Do not use (P)	Do not use	Do not use	Do not use	NR	NR (A) Do not use (P)	NR (A) Do not use (P)	NR (A) Do not use (P)	Do not use	NR (A) Do not use (P)
ethephon (Ethrel)	7	Export WHP 14 days	Export WHP 7 days	Export WHP 7 days	Do not use	Export WHP 7 days	Export WHP 7 days	Export WHP 7 days	Export WHP 7 days	Export WHP 7 days	Export WHP 7 days
Gibberellic acid (Cytolin)	NR	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	NR	No information. Seek manufacturer advice	No information. Seek manufacturer advice	NR	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice
1-methylcyclopropene (Smartfresh)	NS	NR	NR	No information. Seek manufacturer advice	NR	NR	No information. Seek manufacturer advice	NR	NR	NR	NR

Active ingredient (Example of Common product)	Aust WHP (days)	Codex (Hong Kong)	Canada	China	EU	Hong Kong	Indonesia	Japan*	Malaysia	Singapore	Thailand
1-naphthylacetic acid (NAA)	1	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	Export WHP 1 day.	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice	No information. Seek manufacturer advice
paclobutrazol (Cultar)	21	Export WHP - 105 days.	Export WHP - 105 days	Export WHP - 105 days	Export WHP - 105 days	Export WHP - 56 days.	No MRL set	Export WHP - 56 days.	Export WHP - 105 days	Export WHP - 105 days	Export WHP - 105 days
prohexadione (Regalis)	56	No MRL set.	Export WHP - 56 days.	No MRL set	Export WHP - 56 days.	Export WHP - 56 days	No MRL set.	Export WHP - 56 days.	No MRL set.	No MRL set..	No MRL set.

NR - Not Required NS - Not Set

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10.3.5 Apple varieties grown sheet

Apple varieties grown

The main apple varieties grown in Australia are, in order of harvest; Royal Gala and its red strains 22.8% of production, Red Delicious 7.7%, Golden Delicious 2.5%, Granny Smith 15.7%, Fuji 7.4%, Cripps Pink (Pink Lady™) and its red strains 32.1% and Cripps Red (Sundowner™) 5.5%.

The “other apple” category constitutes 6.3% of total production. This category is made up of the two new varieties grown in commercial quantities; Jazz™ and Kanzi™, with a range of new proprietary/club varieties being trialled in different geographic regions in increasing quantities; Aztec™, Bravo™, Envy™, Eve™, Kalei™, Modi™, Rocket™, Smitten™ and Papple™.

Royal Gala

Characteristics:

Strong red/pink blush colour. Some strains of Gala are recognisable for their striped skin.

Gala is a round sweet apple that is dense, aromatic and juicy with white flesh.



Red Delicious

Characteristics:

A crimson to dark red apple, easily identifiable by five distinct red crowns on the base of the apple.

It has a sweet, highly aromatic, creamy white, crisp firm flesh.



Golden Delicious

Characteristics:

Bright yellow to golden skin colour, sometimes with a pink tinge. It is at its best when the skin turns from green to gold.

An excellent eating apple with crisp, creamy white flesh, which is sweet, tasty and juicy.



Fuji

Characteristics:

The skin of Fuji can vary, but it has a predominantly red/dull pink blush over a green/yellow base. A medium-sized apple, with a honey sweet taste. Fuji often has a see-through core.

It is firm-textured, crisp and juicy with very dense flesh.



Granny Smith

Characteristics:

Bright green skin colour that may exhibit a pink blush.

One of the best cooking apples with a tart, tangy flavour and a crisp texture.



Cripps Pink – Pink Lady™

Characteristics:

Cripps Pink (sold as Pink Lady™) is a bi-colour apple with a pink blush over a greenish yellow base.

It is crisp with a dense, firm flesh and an excellent effervescent flavour.



Cripps Red – Sundowner™

Characteristics:

Cripps Red (sold as Sundowner™) has a dark red skin and is round in shape.

It's most prominent feature is white markings called lenticels that occur naturally on the skin.

The sugar levels improve with age, making it a sweet, flavoursome apple.



10.3.6 Apple cultivar product specifications

PRODUCT DESCRIPTION LANGUAGE - APPLES

WHAT IS A PRODUCT DESCRIPTION LANGUAGE?

A Product Description Language (PDL) is a set of photographs and definitions used to describe a product. It focuses on the key quality characteristics of a product and describes them in a way that is readily measured. In this way a PDL can be used by growers, packers, processors, wholesalers, exporters and retail customers to identify what quality attributes are important to them. It also gives the opportunity to specify and negotiate what style of blemish, colour, shape, sweetness or other parameter is available to supply or acceptable to purchase.

WHAT IS THIS REFERENCE GUIDE?

First, it is worth noting that the Export Control Orders Schedule for apples is no longer enforceable. Second, quality systems of the type that many apple packers are implementing require a clear understanding of what the customer wants, and a clear knowledge of your ability to supply. To do this requires a language to describe the product so that the specifications are understood by all parties and are measurable, like equipment or spare parts catalogues for example.

This Reference guide contains photographs and definitions that specifically relate to the quality of apples. It is designed for use by growers, packers, marketers and buyers of apples to negotiate or to report on the quality of apples. It is not intended to replace any existing grades or standards that are used by packers and marketers themselves. Rather, it is designed to enable existing grade specifications to be put into a language that will be adopted across the industry.

Apples packed under this system can be labelled under any grade standards that may be required such as Codex Alimentarius or Organisation for Economic Co-operation and Development (OECD) agreements so long as the fruit meets these standards.

HOW TO USE THIS LANGUAGE

The Reference guide sets out and defines quality parameters applicable to apples such as shape, colour, blemish, etc. It then suggests some options within each parameter. The options are at three levels (A, B and C) and each level is termed a style. When buyers order, they negotiate the quality parameter types and styles and the percentages of each they require. When packing fruit, packers are given the quality parameters of the fruit and the percentage of each style which is required in the finished pack.

In simple terms this Product Description Language for Apples does the following:

1. Describes the quality parameters of apples.
2. Specifies styles of each quality parameter.
3. Provides some guidance and suggested documents for use of the language by packers, their suppliers and their customers.

Basic Quality Expectations

In this Reference guide, apples are assumed to be packed for domestic and export fresh fruit markets. It is acknowledged that substantial quantities of apples are processed each season, and that styles of product not depicted in this guide may be necessary for this purpose. Irrespective of the destination of the product, there are some basic attributes which should be met.

- 1. Intact:** apples should be free of major injury or spoilage.
- 2. Sound:** apples should not be overripe, soft or wilted, they should be free of foreign odours and foreign tastes, and free of injury and blemish which is likely to affect keeping quality.
- 3. Clean:** apples must be free of dirt, dust, unacceptable chemical residues and other foreign matter.
- 4. Palatable:** apples must be of a variety and in a condition which is acceptable to consumers.

Apple Quality Parameters

There are two types of quality attributes of apples, namely those which are a function of the natural process of fruit growth (“general parameters”) and those which are the result of undesirable interference (“defects”).

The general parameters are:

- shape
- colour
- blush
- russet
- maturity (starch, sugars and pressure)

Defects included in this guide are:

- misshape
- skin marks
- sunburn
- hail damage
- bruising

MAKING IT WORK

Any language which helps define a product depends on the ability to measure or assess the fruit to see how it meets the specification. The idea is to minimise the use of words like “reasonably”, “practically”, “usually”, “almost”, “not many” and “few”. These words have many interpretations. They lead to disputes between packers and their customers because both parties have different interpretations of what they mean. The use of photographs assists greatly with interpretation.

By measuring colour as the percentage of the skin surface coloured with red, or by measuring blemish by square centimetres for example, the room for error and subsequent dispute is minimised. However, the process of packing apples to a specification relies on having adequate procedures for sampling product and recording the results.

Some draft documents for customer specifications and checking packed apples are included following this section, as well as suggested procedures for using the documents. There are other documents currently in use by apple packers, and anyone wishing to set up their own product specification sheet and quality check sheet should not encounter any difficulty obtaining ideas from others.

Packers should be aware that there are other aspects to a customer's specification for apples. Issues that need to be taken into account include:

- Labelling
- Carton size, shape and materials
- Pallet dimensions
- Strapping
- Corner pieces
- Time and mode of delivery
- Temperature management



DELICIOUS

Colour	<p>PREMIUM TRAY (6kg) Greater than 90% red, stripy red background allowed</p> <p>STANDARD (12kg) COMBAT (12kg) Greater than 80% red, stripy background allowed</p>																											
Appearance	Bright																											
Eating Quality	Crisp, mild flavour																											
Maturity	Crisp firm flesh, no greasy or wrinkly skin																											
Brix	Minimum Brix 11.5																											
Firmness	Minimum Firmness at 6kg at 11mm probe																											
Size	<p>PREMIUM TRAY (6kg): Count 25/28, 30, 32/33. Premium orders should not contain more than two counts per pallet.</p> <p>STANDARD LARGE (12kg): Count 65/66, 60 STANDARD MEDIUM (12kg): Count 75/76, 70, 82 Count size to be printed on carton/crate label.</p> <p>BIN LINES: Count 50, 54, 60, 65/66, 70, 75/76 No more than one count per bin. Primary Size check: Count reference. Primary Weight check: Box net weight. If the product presents poorly and is not uniform in size the weight reference table should be used.</p> <p>Weight Reference Table:</p> <table border="1"> <thead> <tr> <th>Count</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>75</td> <td>152</td> <td>175</td> </tr> <tr> <td>76</td> <td>152</td> <td>167</td> </tr> <tr> <td>70</td> <td>165</td> <td>181</td> </tr> <tr> <td>65</td> <td>180</td> <td>196</td> </tr> <tr> <td>66</td> <td>177</td> <td>196</td> </tr> <tr> <td>60</td> <td>190</td> <td>224</td> </tr> <tr> <td>53</td> <td>218</td> <td>250</td> </tr> <tr> <td>54</td> <td>218</td> <td>250</td> </tr> </tbody> </table> <p>A tolerance of +/- 3 grams will apply to 10% of the box for any of the previously mentioned weights *Premium sizing legend* Count 50 (12kg) = 25 (6kg) Count 54/53 (12kg) = 27 (6kg) Count 60 (12kg) = 30 (6kg) Count 65/66 (12kg) = 33/32 (6kg)*</p>	Count	Min	Max	75	152	175	76	152	167	70	165	181	65	180	196	66	177	196	60	190	224	53	218	250	54	218	250
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65	180	196																										
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60	190	224																										
53	218	250																										
54	218	250																										
Shape	Elongated																											

DELICIOUS

<p>Defects</p>	<p>PREMIUM TRAY 6kg: Minor defects: must not exceed three pieces of fruit Major defects: nil</p> <p>STANDARD (12kg) COMBAT (12kg) Minor defects: must not exceed 7 pieces of fruit Major defects: must not exceed 2 pieces of fruit</p> <p>BIN LINES: Minor defects: must not exceed 10% Major defects: must not exceed 2%</p> <p>Defects Minor Minor defects are those that do not affect the shelf life of the product, including:</p> <ul style="list-style-type: none"> • Failing colour requirements • Russet if exhibited on the body of the fruit and is greater than 0.5cm² but less than 5c coin • Stalk cavity russet if it exceeds the shoulder of the fruit • Skin marks if greater than 0.5cm² but less than 5c coin • Superficial bruising which is discoloured at the surface and superficial in depth and is greater than 5c coin and less than 10c coin • Sunburn which is superficial in depth and discoloured at the surface i.e. yellow/brown • Healed hail if greater than 0.5cm² but less than 5c coin, may be accumulative • Thrip damage if greater than 0.5cm² but less than 5c coin, may be accumulative <p>Defects Major Major defects are those that affect the shelf life and retail performance of the product of the product and include storage disorders and defects, including:</p> <ul style="list-style-type: none"> • Failing pressure/firmness, brix levels or any maturity requirement • Bruising, which is discoloured at the surface and protrudes into the flesh or bruising that is superficial (as previously defined) but greater than 10c coin • Skin marking greater than 5c coin • Unhealed hail damage or healed damage which is greater than 5c coin • Stems punctures which are unhealed or are healed and protrude deep into the flesh • All rots and moulds • All cuts and splits • Pest and insect damage • Bitter pit • Scald • Greasy in texture
<p>Presentation</p>	<p>A minimum of 85% fruit stickered with the Aussie Apple sticker with correct PLU</p>
<p>Treatment</p>	<p>Washed and polished Waxed</p>
<p>Pulp Temperature</p>	<p>1 - 12°C Standard 1 - 12°C Early season</p>

FUJI																																								
Colour	PREMIUM TRAY (6kg) STANDARD (12kg) green background with > 60% mild pink/maroon/red blush COMBAT (12kg) green background with > 50% mild pink/maroon/red blush																																							
Appearance	Speckled body russet is acceptable																																							
Eating Quality	Sweet honey like flavour, crisp texture																																							
Maturity	Bright, no dull or greasy skin																																							
Brix	Minimum Brix 13																																							
Firmness	Minimum firmness 5.6kg at 11mm probe																																							
Size	<p>PREMIUM TRAY (6kg): Count 25/28, 30, 32/33. Premium orders should not contain more than two counts per pallet.</p> <p>LARGE (12kg): Count 65/66, 60 MEDIUM (12kg): Count 82/83, 75/76, 70 Count size to be printed on carton/crate label.</p> <p>BIN LINES: Count 50, 54, 60, 65/66, 70, 75/76, 83/82, 90 No more than one count per bin. Primary Size check: Count reference. Primary Weight check: Box net weight. If the product presents poorly and is not uniform in size the weight reference table should be used.</p> <p>Weight Reference Table:</p> <table border="1"> <thead> <tr> <th>Count</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr><td>90</td><td>130</td><td>145</td></tr> <tr><td>84</td><td>133</td><td>152</td></tr> <tr><td>83</td><td>139</td><td>155</td></tr> <tr><td>82</td><td>139</td><td>156</td></tr> <tr><td>75</td><td>152</td><td>175</td></tr> <tr><td>76</td><td>152</td><td>167</td></tr> <tr><td>70</td><td>165</td><td>181</td></tr> <tr><td>65</td><td>180</td><td>196</td></tr> <tr><td>66</td><td>177</td><td>196</td></tr> <tr><td>60</td><td>190</td><td>224</td></tr> <tr><td>53</td><td>218</td><td>250</td></tr> <tr><td>54</td><td>218</td><td>250</td></tr> </tbody> </table> <p>A tolerance of +/- 3 grams will apply to 10% of the box for any of the previously mentioned weights *Premium sizing legend* Count 50 (12kg) = 25 (6kg) Count 54/53 (12kg) = 27 (6kg) Count 60 (12kg) = 30 (6kg) Count 65/66 (12kg) = 33/32 (6kg)*</p>	Count	Min	Max	90	130	145	84	133	152	83	139	155	82	139	156	75	152	175	76	152	167	70	165	181	65	180	196	66	177	196	60	190	224	53	218	250	54	218	250
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Shape	Conical/squat																																							

FUJI

<p>Defects</p>	<p>PREMIUM TRAY 6kg: Minor defects: must not exceed three pieces of fruit Major defects: nil</p> <p>STANDARD (12kg) COMBAT (12kg) Minor defects: must not exceed 7 pieces of fruit Major defects: must not exceed 2 pieces of fruit</p> <p>BIN LINES: Minor defects: Must not exceed 10% Major defects: Must not exceed 2%</p> <p>Defects Minor Minor defects are those that do not affect the shelf life of the product, including:</p> <ul style="list-style-type: none"> • Russet if exhibited on the body of the fruit and is greater than 0.5cm² but less than 5c coin • Stalk cavity russet if it exceeds the shoulder of the fruit • Skin marks if greater than 0.5cm² but less than 5c coin • Superficial bruising which is discoloured at the surface and superficial in depth and is greater than 5c coin and less than 10c coin • Sunburn which is superficial in depth and discoloured at the surface i.e. yellow/brown • Healed hail if greater than 0.5cm² but less than 5c coin, may be accumulative • Thrip damage if greater than 0.5cm² but less than 5c coin, may be accumulative <p>Defects Major Major defects are those that affect the shelf life and retail performance of the product of the product and include storage disorders and defects, including:</p> <ul style="list-style-type: none"> • Failing pressure/firmness, brix levels or any maturity requirement • Bruising, which is discoloured at the surface and protrudes into the flesh or bruising that is superficial (as previously defined) but greater than 10c coin • Skin marking greater than 5c coin • Unhealed hail damage or healed damage which is greater than 5c coin • Stems punctures which are unhealed or are healed and protrude deep into the flesh • All rots and moulds • All cuts and splits • Water core is acceptable • Pest and insect damage • Bitter pit • Scald • Greasy in texture
<p>Presentation</p>	<p>A minimum of 85% fruit stickered with the Aussie Apple sticker with correct PLU</p>
<p>Treatment</p>	<p>Washed and polished Waxed</p>
<p>Pulp Temperature</p>	<p>1 - 12°C Standard 1 - 12°C Early season</p>

GOLDEN DELICIOUS

Colour	A green - yellow golden skin Up to 20% pink blush is acceptable																																							
Appearance	Bright																																							
Eating Quality	Sweet, juicy, crisp, mild flavour																																							
Maturity	Crisp flesh. No dull or greasy skin																																							
Brix	Minimum Brix 12.5																																							
Firmness	Minimum firmness 5.5kg at 11mm probe																																							
Size	<p>PREMIUM TRAY (6kg): Count 25/28, 30, 32/33. Premium orders should not contain more than two counts per pallet.</p> <p>STANDARD LARGE (12kg): Count 65/66, 60 STANDARD MEDIUM (12kg): Count 82/83, 75/76, 70 Count size to be printed on carton/crate label. Primary Size check: Count reference. Primary Weight check: Box net weight. If the product presents poorly and is not uniform in size the weight reference table should be used.</p> <p>Weight Reference Table:</p> <table border="1"> <thead> <tr> <th>Count</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr><td>90</td><td>130</td><td>145</td></tr> <tr><td>84</td><td>133</td><td>152</td></tr> <tr><td>83</td><td>139</td><td>155</td></tr> <tr><td>82</td><td>139</td><td>156</td></tr> <tr><td>75</td><td>152</td><td>175</td></tr> <tr><td>76</td><td>152</td><td>167</td></tr> <tr><td>70</td><td>165</td><td>181</td></tr> <tr><td>65</td><td>180</td><td>196</td></tr> <tr><td>66</td><td>177</td><td>196</td></tr> <tr><td>60</td><td>190</td><td>224</td></tr> <tr><td>53</td><td>218</td><td>250</td></tr> <tr><td>54</td><td>218</td><td>250</td></tr> </tbody> </table> <p>A tolerance of +/- 3 grams will apply to 10% of the box for any of the previously mentioned weights *Premium sizing legend* Count 50 (12kg) = 25 (6kg) Count 54/53 (12kg) = 27 (6kg) Count 60 (12kg) = 30 (6kg) Count 65/66 (12kg) = 33/32 (6kg)*</p>	Count	Min	Max	90	130	145	84	133	152	83	139	155	82	139	156	75	152	175	76	152	167	70	165	181	65	180	196	66	177	196	60	190	224	53	218	250	54	218	250
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54	218	250																																						
Shape	Conical to round																																							

GOLDEN DELICIOUS

<p>Defects</p>	<p>PREMIUM TRAY 6kg: Minor defects: must not exceed five pieces of fruit Major defects: nil</p> <p>STANDARD (12kg) COMBAT (12kg) Minor defects: must not exceed 7 pieces of fruit Major defects: must not exceed 2 pieces of fruit</p> <p>Defects Minor Minor defects are those that do not affect the shelf life of the product, including:</p> <ul style="list-style-type: none"> • Failing colour requirements • Russet if exhibited on the body of the fruit and is greater than .5cm² but less than 5c coin • Stalk cavity russet if it exceeds the shoulder of the fruit • Skin marks if greater than .5cm² but less than 5c coin • Superficial bruising which is discoloured at the surface and superficial in depth and is greater than 5c coin and less than 10c coin • Sunburn which is superficial in depth and discoloured at the surface i.e. yellow/brown • Healed hail if greater than .5cm² but less than 5c coin, may be accumulative • Thrip damage if greater than .5cm² but less than 5c coin, may be accumulative <p>Defects Major Major defects are those that affect the shelf life and retail performance of the product of the product and include storage disorders and defects, including:</p> <ul style="list-style-type: none"> • Failing pressure/firmness, brix levels or any maturity requirement • Bruising, which is discoloured at the surface and protrudes into the flesh or bruising that is superficial (as previously defined) but greater than 10c coin • Skin marking greater than 5c coin • Unhealed hail damage or healed damage which is greater than 5c coin • Stems punctures which are unhealed or are healed and protrude deep into the flesh • All rots and moulds • All cuts and splits • Pest and insect damage • Bitter pit • Scald • Greasy in texture
<p>Presentation</p>	<p>A minimum of 85% fruit stickered with the Aussie Apple sticker with correct PLU</p>
<p>Treatment</p>	<p>Washed and polished Waxed</p>
<p>Pulp Temperature</p>	<p>1 - 12°C Standard 1 - 12°C Early season</p>

GRANNY SMITH

Colour	Green skin Product may exhibit a pink blush																																				
Appearance	Bright																																				
Eating Quality	Tart apple, crisp texture																																				
Brix	Minimum Brix 11																																				
Firmness	Minimum firmness at 6.5kg at 11mm probe																																				
Size	<p>PREMIUM TRAY (6kg): Count 25/28, 30, 32/33. Premium orders should not contain more than two counts per pallet.</p> <p>LARGE (12kg): Count 65/66, 60, MEDIUM (12kg): Count 75/76, 70, 82/83 Count size to be printed on carton/crate label.</p> <p>BIN LINES: Count 50, 54, 60, 65/66, 70, 75/76, 83/82, 90 No more than one count per bin. Primary Size check: Count reference. Primary Weight check: Box net weight. If the product presents poorly and is not uniform in size the weight reference table should be used.</p> <p>Weight Reference Table:</p> <table border="1"> <thead> <tr> <th>Count</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr><td>90</td><td>130</td><td>145</td></tr> <tr><td>83</td><td>139</td><td>155</td></tr> <tr><td>82</td><td>139</td><td>156</td></tr> <tr><td>75</td><td>152</td><td>175</td></tr> <tr><td>76</td><td>152</td><td>167</td></tr> <tr><td>70</td><td>165</td><td>181</td></tr> <tr><td>65</td><td>180</td><td>196</td></tr> <tr><td>66</td><td>177</td><td>196</td></tr> <tr><td>60</td><td>190</td><td>224</td></tr> <tr><td>53</td><td>218</td><td>250</td></tr> <tr><td>54</td><td>218</td><td>250</td></tr> </tbody> </table> <p>A tolerance of +/- 3 grams will apply to 10% of the box to any of the previously mentioned weights *Premium sizing legend* Count 50 (12kg) = 25 (6kg) Count 54/53 (12kg) = 27 (6kg) Count 60 (12kg) = 30 (6kg) Count 65/66 (12kg) = 33/32 (6kg)*</p>	Count	Min	Max	90	130	145	83	139	155	82	139	156	75	152	175	76	152	167	70	165	181	65	180	196	66	177	196	60	190	224	53	218	250	54	218	250
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Shape	Conical to round																																				

GRANNY SMITH

<p>Defects</p>	<p>PREMIUM TRAY 6kg: Minor defects: must not exceed three pieces of fruit Major defects: nil</p> <p>STANDARD (12kg) Minor defects: must not exceed 7 pieces of fruit Major defects: must not exceed 2 pieces of fruit</p> <p>BIN LINES: Count 50, 54, 60, 65/66, 70, 75/76, 83/82, 90 No more than one count per bin.</p> <p>Defects Minor Minor defects are those that do not affect the shelf life of the product, including:</p> <ul style="list-style-type: none"> • Russet if exhibited on the body of the fruit and if less than 5c coin • Stalk cavity russet if it exceeds the shoulder of the fruit • Skin marks if less than 5c coin • Superficial bruising that is discoloured at the surface and superficial in depth and is greater than 5c coin and less than 10c coin • Sunburn which is superficial in depth and discoloured at the surface i.e. yellow/brown • Healed hail if less than 5c coin • Thrip damage if less than 5c coin <p>Defects Major Major defects are those that affect the shelf life and retail performance of the product of the product and include storage disorders and defects, including:</p> <ul style="list-style-type: none"> • Failing pressure/firmness, brix levels or any maturity requirement • Bruising, which is discoloured at the surface and protrudes into the flesh or bruising that is superficial (as previously defined) but greater than 10c coin. • Skin marking greater than 5c coin • Unhealed hail damage or healed damage which is greater than 5c coin • Stems punctures which are unhealed or are healed and protrude deep into the flesh • All rots and moulds • All cuts and splits • Pest and insect damage • Bitter pit • Scald • Product which is greasy in texture
<p>Presentation</p>	<p>A minimum of 85% fruit stickered with the Aussie Apple sticker with correct PLU</p>
<p>Treatment</p>	<p>Washed and polished Waxed</p>
<p>Pulp Temperature</p>	<p>1 - 12°C Standard</p>

PINK LADY®

Colour	<p>PREMIUM TRAY (6kg): A green/cream background with a minimum 75% Pink/light Red Blush</p> <p>STANDARD(12kg) A green/cream background with a minimum 45% Pink/light Red Blush</p>																																							
Appearance	Bright																																							
Eating Quality	Tart apple with a sweet balance. Crisp flesh.																																							
Maturity	Crisp flesh. not dull or greasy skin.																																							
Brix	Minimum Brix 14																																							
Firmness	Minimum firmness 6.3kg at 11mm probe																																							
Size	<p>PREMIUM TRAY (6kg): Count 25/28, 30, 32/33. Premium orders should not contain more than two counts per pallet.</p> <p>STANDARD LARGE (12kg): Count 65/66, 60</p> <p>STANDARD MEDIUM (12kg): Count 82/83, 75/76, 70 Count size to be printed on carton/crate label. Primary Size check: Count reference. Primary Weight check: Box net weight. If the product presents poorly and is not uniform in size the weight reference table should be used.</p> <p>Weight Reference Table:</p> <table border="1"> <thead> <tr> <th>Count</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr><td>90</td><td>130</td><td>145</td></tr> <tr><td>84</td><td>133</td><td>152</td></tr> <tr><td>83</td><td>139</td><td>155</td></tr> <tr><td>82</td><td>139</td><td>156</td></tr> <tr><td>75</td><td>152</td><td>175</td></tr> <tr><td>76</td><td>152</td><td>167</td></tr> <tr><td>70</td><td>165</td><td>181</td></tr> <tr><td>65</td><td>180</td><td>196</td></tr> <tr><td>66</td><td>177</td><td>196</td></tr> <tr><td>60</td><td>190</td><td>224</td></tr> <tr><td>53</td><td>218</td><td>250</td></tr> <tr><td>54</td><td>218</td><td>250</td></tr> </tbody> </table> <p>A tolerance of +/- 3 grams will apply to 10% of the box for any of the previously mentioned weights</p> <p>*Premium sizing legend*</p> <p>Count 50 (12kg) = 25 (6kg)</p> <p>Count 54/53 (12kg) = 27 (6kg)</p> <p>Count 60 (12kg) = 30 (6kg)</p> <p>Count 65/66 (12kg) = 33/32 (6kg)*</p>	Count	Min	Max	90	130	145	84	133	152	83	139	155	82	139	156	75	152	175	76	152	167	70	165	181	65	180	196	66	177	196	60	190	224	53	218	250	54	218	250
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Shape	Conical																																							

PINK LADY®

<p>Defects</p>	<p>PREMIUM TRAY 6kg: Minor defects: must not exceed five pieces of fruit Major defects: nil</p> <p>STANDARD (12kg) COMBAT (12kg) Minor defects: must not exceed 7 pieces of fruit Major defects: must not exceed 2 pieces of fruit</p> <p>Defects Minor Minor defects are those that do not affect the shelf life of the product, including:</p> <ul style="list-style-type: none"> • Russet if exhibited on the body of the fruit and if less than 5c coin • Stalk cavity russet if it exceeds the shoulder of the fruit • Skin marks if less than 5c coin • Superficial bruising that is discoloured at the surface and superficial in depth and is greater than 5c coin and less than 10c coin • Sunburn which is superficial in depth and discoloured at the surface i.e. yellow/brown • Healed hail if less than 5c coin • Thrip damage if less than 5c coin <p>Defects Major Major defects are those that affect the shelf life and retail performance of the product of the product and include storage disorders and defects, including:</p> <ul style="list-style-type: none"> • Failing pressure/firmness, brix levels or any maturity requirement • Bruising, which is discoloured at the surface and protrudes into the flesh or bruising that is superficial (as previously defined) but greater than 10c coin • Skin marking greater than 5c coin • Unhealed hail damage or healed damage which is greater than 5c coin • Stems punctures which are unhealed or are healed and protrude deep into the flesh • All rots and moulds • All cuts and splits • Pest and insect damage • Bitter pit • Scald • Product which is greasy in texture
<p>Presentation</p>	<p>A minimum of 85% fruit stickered with the Aussie Apple sticker with correct PLU</p>
<p>Treatment</p>	<p>Washed and polished Waxed</p>
<p>Pulp Temperature</p>	<p>1 - 12°C Standard 1 - 12°C Early season</p>

ROYAL GALA

Colour	A creamy/light green background with equal to or >60% red stripe																																				
Appearance	Bright																																				
Eating Quality	Sweet, juicy, crisp, aromatic flavour																																				
Maturity	Crisp, not dull and greasy																																				
Brix	Minimum Brix 11.8																																				
Firmness	Firmness greater or equal to 6.5kg (11mm probe) No more than 10% of fruit less than 5.5kg (11mm probe)																																				
Size	<p>LARGE (12kg): Count 65/66, 60</p> <p>MEDIUM (12kg): Count 82/83, 75/76, 70</p> <p>Count size to be printed on carton/crate label.</p> <p>BIN LINES: Count 50, 54, 60, 65/66, 70, 75/76, 83/82</p> <p>No more than one count per bin.</p> <p>Primary Size check: Count reference.</p> <p>Primary Weight check: Box net weight.</p> <p>If the product presents poorly and is not uniform in size the weight reference table should be used.</p> <p>Weight Reference Table:</p> <table border="1"> <thead> <tr> <th>Count</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>84</td> <td>133</td> <td>152</td> </tr> <tr> <td>83</td> <td>139</td> <td>155</td> </tr> <tr> <td>82</td> <td>139</td> <td>156</td> </tr> <tr> <td>75</td> <td>152</td> <td>175</td> </tr> <tr> <td>76</td> <td>152</td> <td>167</td> </tr> <tr> <td>70</td> <td>165</td> <td>181</td> </tr> <tr> <td>65</td> <td>180</td> <td>196</td> </tr> <tr> <td>66</td> <td>177</td> <td>196</td> </tr> <tr> <td>60</td> <td>190</td> <td>224</td> </tr> <tr> <td>53</td> <td>218</td> <td>250</td> </tr> <tr> <td>54</td> <td>218</td> <td>250</td> </tr> </tbody> </table>	Count	Min	Max	84	133	152	83	139	155	82	139	156	75	152	175	76	152	167	70	165	181	65	180	196	66	177	196	60	190	224	53	218	250	54	218	250
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Shape	Conical																																				

ROYAL GALA

<p>Defects</p>	<p>Minor defects: must not exceed 10% Major defects: must not exceed 2%</p> <p>Defects Minor Minor defects are those that do not affect the shelf life of the product including:</p> <ul style="list-style-type: none"> • Russet if exhibited on the body of the fruit and if less than 5c coin • Stalk cavity russet if it exceeds the shoulder of the fruit • Skin marks if less than 5c coin • Superficial bruising that is discoloured at the surface and superficial in depth and is greater than 5c coin and less than 10c coin • Sunburn which is superficial in depth and discoloured at the surface i.e. yellow/brown • Healed hail if less than a 5c coin • Thrip damage if less than a 5c coin <p>Defects Major Major defects are those that affect the shelf life and retail performance of then product and include storage disorders and defects such as:</p> <ul style="list-style-type: none"> • Failing pressure/firmness, brix levels or any maturity requirement • Bruising, which is discoloured at the surface and protrudes into the flesh or bruising that is superficial (as previously defined) but greater than a 10c coin • Skin marking greater than a 5c coin • Unhealed hail damage or healed damage which is greater than a 5c coin • Stems punctures which are unhealed or are healed and protrude deep into the flesh • All rots and moulds • All cuts and splits • Pest and insect damage • Bitter pit • Scald • Product which is greasy in texture
<p>Presentation</p>	<p>A minimum of 85% fruit stickered with the Aussie Apple sticker with correct PLU</p>
<p>Treatment</p>	<p>Washed and polished Waxed</p>
<p>Pulp Temperature</p>	<p>1 - 10°C Standard 1 - 10°C Early season</p>

SUNDOWNER

Colour	75% full red stripe or block on a lime green/yellow background. Prominent white lenticels are a characteristic of this variety.																																							
Appearance	Bright																																							
Eating Quality	Sweet, juicy, crisp																																							
Maturity	Flesh crisp. Skin not to be dull or greasy.																																							
Brix	Minimum Brix 13																																							
Firmness	Minimum firmness 6.5kg at 11mm probe																																							
Size	<p>PREMIUM (12kg): Count 65/66, 60</p> <p>STANDARD (12kg): Count 82/83, 75/76, 70</p> <p>BIN LINES: Count 50, 54, 60, 65/66, 70, 75/76, 83/82, 90</p> <p>No more than one count per bin. Sizing must be discussed with buyer prior to delivery.</p> <p>Primary Size check: Count reference.</p> <p>Primary Weight check: Box net weight.</p> <p>If the product presents poorly and is not uniform in size the weight reference table should be used.</p> <p>Weight Reference Table:</p> <table border="1"> <thead> <tr> <th>Count</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr><td>90</td><td>130</td><td>145</td></tr> <tr><td>84</td><td>133</td><td>152</td></tr> <tr><td>83</td><td>139</td><td>155</td></tr> <tr><td>82</td><td>139</td><td>156</td></tr> <tr><td>75</td><td>152</td><td>175</td></tr> <tr><td>76</td><td>152</td><td>167</td></tr> <tr><td>70</td><td>165</td><td>181</td></tr> <tr><td>65</td><td>180</td><td>196</td></tr> <tr><td>66</td><td>177</td><td>196</td></tr> <tr><td>60</td><td>190</td><td>224</td></tr> <tr><td>53</td><td>218</td><td>250</td></tr> <tr><td>54</td><td>218</td><td>250</td></tr> </tbody> </table> <p>A tolerance of +/- 3 gram will apply to 10% of the box for any of the previously mentioned weights</p> <p>*Premium sizing legend*</p> <p>Count 50 (12kg) = 25 (6kg)</p> <p>Count 54/53 (12kg) = 27 (6kg)</p> <p>Count 60 (12kg) = 30 (6kg)</p> <p>Count 65/66 (12kg) = 33/32 (6kg)*</p>	Count	Min	Max	90	130	145	84	133	152	83	139	155	82	139	156	75	152	175	76	152	167	70	165	181	65	180	196	66	177	196	60	190	224	53	218	250	54	218	250
Count	Min	Max																																						
90	130	145																																						
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83	139	155																																						
82	139	156																																						
75	152	175																																						
76	152	167																																						
70	165	181																																						
65	180	196																																						
66	177	196																																						
60	190	224																																						
53	218	250																																						
54	218	250																																						
Shape	Round																																							

SUNDOWNER

<p>Defects</p>	<p>PREMIUM TRAY 6kg: Minor defects: must not exceed three pieces of fruit Major defects: nil One in every three trays may exhibit a major defect</p> <p>PREMIUM (12kg) STANDARD (12kg) COMBAT (12kg) Minor defects: must not exceed 7 pieces of fruit Major defects: must not exceed 2 pieces of fruit</p> <p>BIN LINES: Minor defects: must not exceed 10% Major defects: must not exceed 2%</p> <p>Defects Minor Minor defects are those that do not affect the shelf life of the product, including:</p> <ul style="list-style-type: none"> • Russet if exhibited on the body of the fruit and if less than 5c coin • Stalk cavity russet if it exceeds the shoulder of the fruit • Skin marks if less than 5c coin • Superficial bruising that is discoloured at the surface and superficial in depth and is greater than 5c coin and less than 10c coin • Sunburn which is superficial in depth and discoloured at the surface i.e. yellow/brown • Healed hail if less than 5c coin • Thrip damage if less than 5c coin <p>Defects Major Major defects are those that affect the shelf life and retail performance of the product of the product and include storage disorders and defects including:</p> <ul style="list-style-type: none"> • Failing pressure/firmness, brix levels or any maturity requirement • Bruising, which is discoloured at the surface and protrudes into the flesh or bruising that is superficial (as previously defined) but greater than 10c coin. • Skin marking greater than 5c coin • Unhealed hail damage or healed damage which is greater than 5c coin • Stems punctures which are unhealed or are healed and protrude deep into the flesh • All rots and moulds • All cuts and splits • Pest and insect damage • Bitter pit • Scald • Product which is greasy in texture
<p>Presentation</p>	<p>A minimum of 85% fruit stickered with the Aussie Apple sticker with correct PLU</p>
<p>Treatment</p>	<p>Washed and polished Waxed</p>
<p>Pulp Temperature</p>	<p>1 - 12°C Standard 1 - 12°C Early season</p>



Australian Government
**Department of Agriculture
and Water Resources**

