

## **Final Report**

# **Lychee knowledge transfer at the 2018 China Litchi Conference**

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**Delivery partner:**

Australian Lychee Growers Association

**Project code:**

LY17001

**Project:**

LY17001 - Lychee knowledge transfer at the 2018 China Litchi Conference

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## Summary

The Australian Lychee industry management committee members received an official invitation from Professors from the South China Agricultural University to attend and participate in the 2018 China International Litchi Business Conference. The conference took place in Conghua a district of Guangzhou in Central Guangdong Province of China from 27th to 30th June 2018.

The main co-sponsorships of the conference were the China Litchi and Longan Research System, the Ministry of Agriculture and Rural Affairs, and the Department of Agriculture of Guangdong Province. A symposium and technology training sessions were also arranged in parallel with the conference. Litchi cultivars were displayed and available for tasting at the venue. A field visit to litchi orchards, machinery demonstration and post-harvest treatment and processing also scheduled on the second day of the conference.

The Conference & Business activities were arranged over a 4 day period with a separate round table discussion scheduled for the international participants on 28<sup>th</sup> June. The international collaboration on research, trade and market access, including the possibility and channels for Australian lychee export to China were the main topics. Relevant marketing scholars of China Litchi and Logan Research System (CARS-L&L) and Chinese government officials participated in this discussion.

Many research & scientific delegations from China have visited Australian lychee orchards and the Australian Lychee Growers Association over a number of years with the most recent visit in 2015. From this visit the China Ministry of Agriculture published 2 articles titled “Australian Litchi Industry Development and Enlightenment to China (1) & (11).

Due to these visits and reciprocal visits to China, the Australian lychee industry & China Agricultural University have formed very good relationships and after careful consideration, ALGA decided that it would be in the industry’s best interest if an Australian lychee delegation was present at the Conference if the industry wished to maintain an open dialogue, joint communication & ties with China to keep trade & market access discussions progressing.



## Keywords

China; lychee; litchi; Australia; export; import; 2018; conference; Guangzhou; industry; machinery; demonstration; round table; brand; Association; ALGA; knowledge transfer

## Introduction

The Australian Lychee industry is represented by the Australian Lychee Growers Association which is the Industry Representative Body for lychee growers. There are approx 250 lychees orchards in Queensland and NSW, but the bulk of the annual tonnage is produced in the North Qld Tablelands, Central Qld and South East Qld areas.

Australia is a commercial producer of lychee with current annual production ranging from 3,000 to 3,500 tonnes, depending on climatic & seasonal conditions. Grower numbers have reduced over the past 10 years although a number of existing growers have increased their plantings. Because of this the annual tonnage has not altered too dramatically.

All Australian lychees are marketed as fresh fruit because the industry uses airfreight and cool chain to provide fresh, best quality 'chemical free' lychees to markets. Lychees were introduced into Australia more than 100 years ago and the Australian lychee industry is unique in having the longest lychee production season in the world. Due to the introduction of earlier and later fruiting varieties and the extensive production zones from tropical to temperate climates, the industry produces fruit from October in Far North Queensland to early April in Northern New South Wales. This gives the Australian industry a significant advantage over other suppliers on world markets, as no other country can offer such a long line of supply of quality controlled fresh lychee product.

The bulk of Australia's lychee production is sold domestically with between 20% and 30% of lychee crop exported. Lychees are currently exported to Hong Kong, Singapore, Malaysia, Indonesia, United Kingdom, France, Belgium, United Arab Emirates, Tahiti, New Zealand, USA and Canada.

Australian lychees are produced counter seasonal to Chinese production and market access would allow fresh lychee to be available for the Chinese New Year and Chinese holiday Spring Festival season (January to March depending on the lunar calendar).

China is the home of lychee and the world's largest producer, producing fruit from May to early August. Australia is a relatively new producer of lychee with the industry developing from the early 1980's. The Australian Lychee Industry recognizes that China is the first and foremost lychee producer in the world and Australian growers have much to learn from their Chinese counterparts. Although there does appear to be many things that China could adopt from Australian growers and the Australian lychee industry as stated in the following 2015 abstract for "Australian Litchi Industry Development and Enlightenment in China":

**Abstract:** *This article is based on the modern industrial technology system of litchi and longan, and the industrial economic team's inspection of the litchi industry in Queensland, Australia. The specific content includes the basic situation of the Australian litchi industry, in-depth introduction of Australia's litchi plantation farms, growers' associations, sales organizations and litchi export and quarantine processes. On this basis, comparing the differences in litchi industry between China and Australia, China should learn from the experience of Australia's industrial organization development and post-production processing. This paper proposes a place where Chinese litchi industry development can learn from Australia. (copy attached)*

## Methodology

### Australian Embassy Beijing:

Prior to commencement of the Business Conference in Guangzhou, delegates from the Australian Lychee Growers Association had a prearranged meeting with the Australian Counsellor (Technical) Department of Agriculture & Water Resources based at the Australian Embassy in Beijing. The meeting was to discuss and advise the lychee industry of the current Australian & China trade situation for progressing market access for Australian lychee.

### 2018 China Litchi International Business Conference:

#### Day 1: Opening session

- China litchi industry development summit forum
  - Estimated 2.8 million tonnes of lychee produced in China 2018
    - Highest production year in China's history
    - Harvest period to reach 130 days (mid-April to mid-July)
  - China is 80% of world production
  - Guangdong produces 50% of China production
  - China transforming from Quantity to Quality
  - Future direction of China market
  - Branding of product
  - Presentation of grower awards

#### Day 2: Technical Tour

- Lychee Wine & Liqueur processing factory
- Lychee orchard & machinery demonstrations
- Continuation of Litchi Conference including:
  - Overview of Australian Lychee Industry (ALGA)
  - Variability of litchi in Bangladesh (Bangladesh)
  - Overview on current Australian lychee R & D (QDAF)
  - Effect of full-cover ethephon applications (SALGA)

#### Day 3: Continuation of Litchi Conference including:

- Labour-saving production and theory
- Post-harvest biology and technology
- Processing

Delegates from China, Australia, South Africa & Bangladesh attended the special round table discussion. The attendees were informed that the Chinese Ministry of Agriculture and Rural areas, provinces and local governments in lychee growing areas have attached a great deal of importance to the establishment of Litchi brands and marketing. There was also much interest in the functioning and roles of the Australian (ALGA) and South African (SALGA) Lychee Associations. China relies more on domestic markets instead of export due to post-harvest treatment protocol procedures. Due to the volume of lychees produced in China processing plants have become a solution for over-supply of produce. Market access for Australian lychee was only briefly mentioned but it was a positive remark "that this could happen soon".

## Outputs

Lychee growing is one of the main agricultural industries in Guangdong Province. The annual International Lychee Conference is a summit of the industry. The 2018 China International Lychee Conference was opened by The Vice Prime Minister of the China Agriculture Department with keynote speakers of the conference being professionals from the lychee industry, including growers, lychee researchers from agriculture institutes, officers of lychee association, lychee products marketing representatives etc. Approx 500 delegates attended the conference.

Key outputs include:

- o Transfer of industry knowledge, research, updates and information gained from attending the 2018 China Lychee Conference to all Australian lychee growers, levy payers, industry stakeholders
- o Submission of Milestone and Final Reports
- o Industry updates & articles published in industry magazine and industry website
- o Further insight into the possibility of progressing market access approval into mainland China
- o Building reciprocal relationships and communication channels with China
- o Increase industry development & heighten industry's reputation
- o Continuation of increased market access & export development to increase returns to growers
- o An industry overview to be presented at the next SIAP meeting
- o An industry overview to be presented at the next growers meeting coinciding with the industry's AGM

## Outcomes

Outcomes of attending the 2018 China International Litchi Business Conference are that the Australian lychee industry has additional & improved knowledge of the China lychee industry and their production systems and research. It has also facilitated new international networks, trade and market access discussions and an industry understanding of the complexity and opportunities involved in exporting to China. It has enhanced the industry's understanding of the commercial landscape, and identified opportunities for long term engagement in the China market.

**Outcomes also include:**

- o New relationships between Australian delegates, international growers, researchers and trade partners initiated
- o Increased understanding of issues and opportunities faced by the international lychee industry and how these are/could impact the Australian industry either positively or negatively
- o Increased understanding of production and marketing techniques currently used internationally and their potential adoption into the Australian context
- o Increased awareness within the Australian industry of any new knowledge or techniques identified during the study tour (as a consequence of the extension/reporting activities undertaken before, during or after the tour)
- o Increased understanding of the opportunity in exporting to China

## Monitoring and evaluation

The Australian Lychee Industry hopes to achieve the desired project results using resources & capacity available by:

- Continuing to communicate with all lychee growers & industry stakeholders
- Continuing to commit to maintaining “best practices” for the industry
- Continuing to source new export markets & maintain existing export & domestic markets
- Explore and expand information on the China in-country demand and basis for price premium
- Explore and expand information on adequate supply chain development in China
- Explore China’s progress & the resulting approval of importing irradiated fruit from Vietnam
- Industry application submission for China Market Access Proposal

Market access and export is an issue concerning the entire Australian lychee industry. The industry is committed to improving export markets and sourcing new export markets to ensure all lychee growers will directly benefit from high counter-seasonal demand from Asian and overseas markets. Non-exporting growers will benefit from more stable prices in the domestic market, especially during December and January, when exports will prevent the oversupply of the Australian market.

**China is a “high priority target market” for the Australian lychee industry.** As early as 2001 the Australian Lychee Industry submitted the first China Market Access Application with 5 more subsequent applications being submitted over the past 17 years. The opportunity for Australian lychee to gain access into the China market would significantly change the supply/demand balance for Australian lychee. There would be an almost immediate increase in demand for Australian lychee, particularly around Chinese New Year.

## Recommendations

Continue to pursue Market Access into China for Australian Lychee. This will not occur in the immediate future and a dedicated and consistent approach from industry will be required

A formation of a China export “team” involving key ALGA committee members and an exporter/s may be required

Source information on supply & in-country (China) demand for Australian Lychee in the counter seasonal period

Source Information on the current supply chain within China

Submission of a Market access proposal based on the following:

- Irradiation as a disinfestation protocol at 400 Gy as used for NZ & USA exports
- A review of the poor host status of lychee
- Information on industry biosecurity practices as required by ICA regulations which further reduces the likelihood of infested fruit reaching the market
- Fruit arriving in China during a “winter window” which is non-conducive to development of pests should/and if they exist

ALGA will continue to engage with business associations and contacts made in China

Where, when and if possible ALGA will attend trade specific forums to further negotiations with China

Additional funding may be required for future research into a Market Access project

## Referred scientific publications

None to report

## References

**Lychee Strategic Investment Plan 2017 - 2021**

**The production and uses of litchis in China** – *Prof Houbin Chen South China Agricultural University*

**Australian Litchi Industry Development & Enlightenment to China (1)** – *Ministry of Agriculture Information Centre “World Agriculture in 2015”*

**Australian Litchi Industry Development & Enlightenment to China (11)** – *Ministry of Agriculture Information Centre “World Agriculture in 2015”*

**Progress of Phytosanitary Irradiation Facility in China** – *Huang Ming Eighth Annual Chapman Phytosanitary Irradiation Forum, Bangkok, Thailand, June 13-15 2018*

## Intellectual property, commercialisation and confidentiality

No project IP

## Acknowledgements

**Australian Lychee Growers Association**

**ALGA Management Committee &/or SIAP members:** *Derek Foley, Jill Houser, Ian Groves, Gavin Macdonald, Martin Joyce*

**Department of Agriculture & Fisheries & SIAP Member:** *Yan Diczbalis*

**Hort Innovation**

## Appendices

**Abstract** – *Derek Foley & Yan Diczbalis*

**ALGA Industry Overview Presentation** – *Derek Foley*

**Lychee R & D Australia Presentation** – *Yan Diczbalis*

**The production and uses of litchis in China** – *Prof Houbin Chen South China Agricultural University*

**Australian Litchi Industry Development & Enlightenment to China (1)** – *Ministry of Agriculture Information Centre “World Agriculture in 2015”*

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**China 2018 International Litchi Business Conference photos**



# AUSTRALIAN LYCHEE GROWERS ASSOCIATION

## ABSTRACTS

### 2018 CHINA INTERNATIONAL LITCHI CONFERENCE

**Round 2:** Derek Foley  
President  
Australian Lychee Growers Association  
Queensland Australia

- Australian Lychee Industry Overview – 30 minutes
  - Australian Production areas
  - Food Safety & Quality Assurance Programs
  - Quality Assurance System
  - Domestic & Export Supply Chain
  - Current export countries
  - Exporting to the USA
  - Industry Standard Grading guide

**Round 2:** Yan Diczbalis  
Principal Horticulturist  
Department of Agriculture & Fisheries  
Queensland Australia

- Academic Presentation – 30 minutes
  - Overview on current lychee R & D
  - Summary on current quarantine protocols for pests & diseases on lychee
  - Disinfestation for exporting Australian lychee including low dose irradiation treatment
  - Current status of trade between China & Australia



## **INDUSTRY OVERVIEW:**

The Australian Lychee industry is represented by the Australian Lychee Growers Association which is the Industry Representative Body or Peak Industry Body for lychee growers. There are approx 250 lychees orchards in Queensland and NSW, but the bulk of the annual tonnage is produced in the North Qld Tablelands, Central Qld and South East Qld areas.

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# **AUSTRALIAN LYCHEE INDUSTRY ALGA**

**INDUSTRY OVERVIEW**  
**2018 China International Litchi Conference**

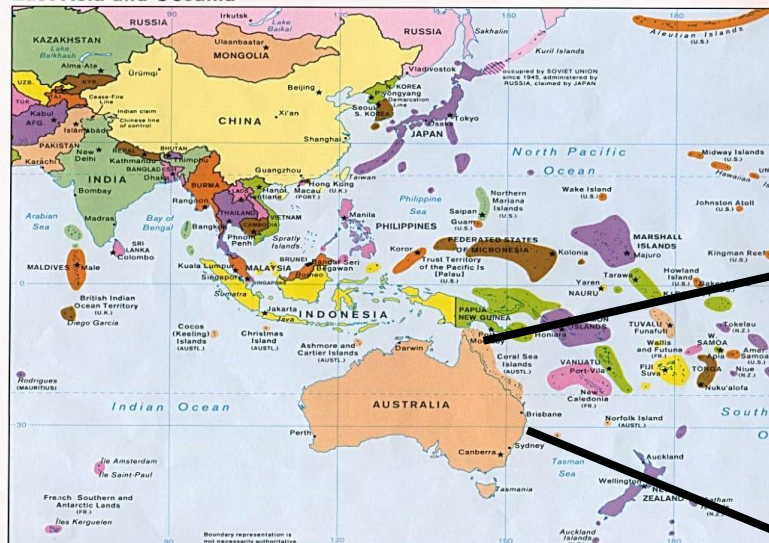




# Australian lychee production areas

Production is 3,500 to 4,000 t/annum

East Asia and Oceania



The Australian lychee industry consists of approximately 250 lychee orchards distributed along the east coast of Queensland and NSW from Cooktown (16°S) to Coffs Harbour (32°S)



- **Production Period:** late October to mid March
- **Peak Production:** December, January, February

# **Australian Domestic & Export Food Safety & Quality Assurance programs**

- Freshcare Edition 4
- HARPS – Harmonised Australian Retailers Produce Scheme
- HACCP
- SQF2000 Edition 8 (January 2<sup>nd</sup> 2018)
- Marketing group standards
- Interstate Certification Assurance (ICA) – Plant Health Certificate
- Unbroken skin (ICA-13)

# Australian Lychee Industry Quality Assurance System

- Record keeping and audit of onfarm chemical use.
- Calibration records for temperature monitoring equipment and chemical application equipment (eg. mist blast sprayers).
- Documentation of fruit picking and handling systems including details of date, time, paddock, variety and pulp temperature when fruit received at the shed.
- Fruit quality grade standards which have allowable limits for a range of fruit defects. The ICA requirements for “unbroken skin” are incorporated into this assessment. The inspection intensity is no less frequent than one in every 50 cartons of fruit.

# Australian Lychee Industry Quality Assurance System (cont'd)

- The fruit quality standards include major and minor defects:
  - there is a nil tolerance for major defects include split skin, signs of pest damage and presence of pests, major physical damage, major browning due to cold damage and or dehydration.
  - minor defects such as marks, scratches, bruising, minor browning have tolerance levels dependent on the auditing authority.
- Fruit pulp temperature records at loading onto the truck (5°C to 14°C).
- These QA and ICA standards for the domestic & export fruit supply chain ensure that fruit moving to the domestic and or export markets are of high quality and free of contamination from pests and disease.

# Australian Domestic & Export Supply Chain

- Fruit is freshly harvested, water cooled & cleaned
- Fruit is graded to meet domestic & export quality standard
- Fruit is packed on farm in poly bags & cardboard cartons
- Fruit is refrigerated from orchard to consumer
- Fruit is transported in refrigerated trucks to domestic markets
- Fruit is airfreighted to export markets





# **AUSTRALIAN LYCHEE INDUSTRY**

## **GRADING GUIDE**





# AUSTRALIAN LYCHEE INDUSTRY GRADING GUIDE

HARVEST FRUIT THAT IS MATURE AND FIRM WITH A GOOD COLOUR (RED OR PINK SKIN) OR THE COLOUR OF THE VARIETY. FRUIT SHOULD BE HYDRATED TO PREVENT BROWNING AND COOLED BETWEEN 5°C AND 10°C FOR TRANSPORTATION.



## GRADING FOR PREMIUM, EXPORT AND FIRST GRADE FRUIT:

- Fruit should be clean with no pulled stems or stings
- Fruit should have minimal dark blemish - no more than 5% dark blemish over entire fruit
- Fruit surface should have no more than 25% of light blemish, silvering or light browning
- The skin colour should be typical of the variety of fruit being harvested
- The fruit surface should have no more than 25% of yellowing
- Fruit must be at least 30 mm diameter across the widest part of the fruit (refer to diagram)
- Small seeded varieties should be at least 25 mm diameter across the widest part of the fruit (refer to diagram)

## GRADING FOR SECOND GRADE FRUIT:

- Fruit should be clean with no pulled stems or stings
- Fruit should have no more than 10% dark blemish
- Fruit surface should have no more than 50% of light blemish, silvering or light browning
- The skin colour should be typical of the variety of fruit being harvested
- The fruit surface should have no more than 50% of yellowing
- Wai Chee must be at least 30 mm diameter across the widest part of the fruit (refer to diagram)
- All other varieties should be at least 25 mm diameter across the widest part of the fruit (refer to diagram)

## SIZING-DIAMETER OF FRUIT FOR GRADING



## MINOR OR OTHER DEFECTS

**FLATID** - Fruit badly infested from Flatid egg mass, nymphs on fruit or fruit blemished with the black sooty mould may be unsaleable and rejected at the packing stage. *(Fruit with light infestation may be successfully scrubbed & cleaned prior to packing and graded accordingly)*



**SOOTY MOULD** - Sooty mould is a fungus that grows on the sugary secretions produced by scale, mealy bug or flatid insects. The dark mould should be scrubbed & the fruit cleaned prior to packing. *(The sooty mould should be graded as a dark blemish)*



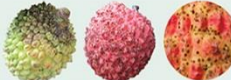
**WIND RUB OR ABRASION** - The visual appearance or skin of the lychee fruit can be damaged by leaves, twigs and other fruit rubbing during windy conditions. *(The fruit is still saleable but the skin damage should be graded as a light or dark blemish)*



**LIGHT BROWNING & SILVERING** - Light browning or silvering on the skin of the lychee fruit is caused by hot dry weather and more common on Wai Mai Pink and Tai So. *(The fruit is still saleable with the fruit being graded as light or dark blemish)*



**PEPPER SPOT** - Pinhead-sized black lesions (about 1 mm in diameter) appear on the surface of the fruit, usually across the shoulders around the stem end. In severe cases, the spots may merge to cover the surface of the fruit. The Wai Mai Pink lychee variety appears to be more susceptible to Pepper Spot damage especially if grown in wetter, humid coastal areas. Pepper Spot damaged fruit can be graded at time of packing although only very minor dark blemish (less than 5% solid or scattered) would be acceptable in Premium, Export or First grade cartons. *(Fruit with no more than 10% would be acceptable in Second grade cartons)*



ALL MAJOR DEFECTS ARE TO BE REJECTED DURING THE GRADING PROCESS WITH MINOR OR OTHER DEFECTS BEING GRADED ACCORDINGLY USING THIS GUIDE. A 2% MARGIN IN PREMIUM/FIRST GRADE & A 5% MARGIN IN SECOND GRADE OF MINOR OR OTHER DEFECTS SHOULD BE CONSIDERED ACCEPTABLE.

## MAJOR OR REJECTED DEFECTS

**PULLED STEM** - Harvest fruit with a small part of the stem intact. If the stem is pulled off, the skin will tear and the fruit will lose moisture and dehydrate. *(Fruit is not suitable for sale and should be rejected prior to packing)*



**MACADAMIA NUT BORER** - The Macadamia Nut Borer larvae bore through the skin and into the seed of the lychee. The entry point can be found on the shoulder or near the peduncle of the fruit. Mature fruit damaged by macadamia nut borer may weep and stain other fruit. *(Fruit is not suitable for sale and should be rejected prior to packing)*



**FRUIT PIERCING MOTH STING** - The Fruit Piercing Moth will damage fruit by piercing small circular holes in the skin of the fruit. Juice may squirt from the hole when the fruit is squeezed. *(Fruit is not suitable for sale and should be rejected prior to packing)*



**ERINOSE MITE (ACERIA LITCHII)** - The Lychee erinose mite is a serious pest that deforms the underside of the leaves, the lychee flowers and eventually the lychee fruit. Fruit with severe erinose mite damage will be distorted with raised dark, spiky lumps. *(Fruit is not suitable for sale and should be rejected prior to packing)*



**ANTHRACNOSE FUNGI** - The Fungi will cause round, dark brown to black lesions on the surface of the fruit and will penetrate the fruit flesh. *(Fruit is not suitable for sale and should be rejected prior to packing)*



**STEM-END ROOT** - The fungus appears as browning of the skin at the stem end of the fruit and will rapidly spread. *(Fruit is not suitable for sale and should be rejected prior to packing)*



**SPLIT FRUIT** - Fruit splitting on trees occurs due to extreme weather conditions and uneven or inadequate watering. After harvest, care is needed when handling the fruit as dropping the fruit will result in the skin of the fruit splitting. *(Split fruit is not saleable and should be rejected prior to grading & packing)*



**GREEN SHIELD SCALE** - The eggs from the female green shield scale insect are small and yellow and can be easily confused with mealy bugs. The young stages of the scale are green. *(The scale needs to be rejected in Premium, Export or First grade cartons. For second grade, it may be possible to clean the fruit prior to packing and grade accordingly)*



GROWERS SUPPLYING PREMIUM GRADE FRUIT TO WOOLWORTHS, COLES, ALDI AND OTHER DIRECT SALES OUTLETS WOULD NEED TO FOLLOW THE REQUIRED GRADING SPECIFICATIONS SET BY EACH OUTLET



**Hort  
Innovation**  
Strategic levy investment

**LYCHEE  
FUND**

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[WWW.AUSTRALIANLYCHEE.COM.AU](http://WWW.AUSTRALIANLYCHEE.COM.AU)



# Australia's current export partners

- New Zealand
- United States of America (excluding Florida)
- Canada
- Malaysia
- Indonesia
- Hong Kong
- Singapore
- United Kingdom
- Europe
- Middle East
- Tahiti

# Australian Lychees gain USA export approval

- In 2013 Australia & continental USA signed an Operational Work Plan (OWP) for the commencement of a 3 year pilot program to export Australian lychee into the USA (excluding the state of Florida)
- 2015/16 season – nil shipments
- 2016/17 season – successful shipments
- 2017/18 season - successful shipments
- 2018 onwards – exports to continue under a new joint agreement
- Australian lychee growers are required to register their orchard and packhouses through ALGA
- Growers and packhouses are audited by both Australian & USA Departments of Agriculture to meet USA export protocols



# Disinfestation for exporting Australian lychee

- Low dose Irradiation (400 Gy) for New Zealand
- Low dose Irradiation (400Gy) for USA
  - Fruit arrives at facility by refrigerated road transport from orchards
  - Fruit is maintained at an ambient temperature for approx 8 hours (pre-treatment, treatment and post-treatment)
  - Fruit is road transported to freight forwarding agent
  - Fruit is airfreighted overnight (3hrs) to New Zealand
  - Fruit is airfreighted approx 14 hours to Los Angeles USA
- Methyl Bromide (24 g/m<sup>3</sup> for 2 hrs at 15°C or equivalent dose) for French Polynesia (Tahiti)



# **Current status of lychee trade between Australia and China**



# Australia – China Cooperation

- China has had access to export lychee to Australia since 2004.
- Fruit requires disinfestation treatments for fruit fly and stem borer (Cold or Vapour Heat (not kind to fruit) irradiation could be another possibility).
- The Australian lychee industry will continue to seek direct market access into the Chinese market.
- ALGA receive regular inquiries from importers in Guangzhou and Shanghai for import possibilities
- Chinese New Year falls within the Australian Lychee harvest and fruit will be available for traditional gift giving representing happiness and good fortune
- The Australian Lychee industry recognises that China is the original home of lychee and the first country to cultivate the fruit
- The Australian Lychee harvest is counter seasonal to the Chinese lychee harvest:
  - Australia – Late October to March
  - China – May to August



# Australia – China Cooperation (cont'd)

- Federal DAF funded project “Quarantine and supply chain management for export lychee (litchi) between China and Australia (2009-2010)
  - Partners
    - Queensland Department of Agriculture and Fisheries
    - Guangdong Inspection and Quarantine Technology Center
    - South China Agricultural University (Guangdong Province Key-Laboratory for Postharvest Technology of Fruit and Vegetables, Department of Horticulture)
  - Fruit treated with a low dose of irradiation (400Gy) is an effective quarantine treatment with negative effects on fruit quality.
  - ALGA believe this treatment could be considered for reciprocal trade between Australia and China

# Lychee R&D - Australia

Yan Diczbalis

Principal Horticulturist

Department of Agriculture and Fisheries (Queensland)



**Queensland**  
Government



# Presentation Topics

- Australian industry location and spread
- Common and other varieties grown
- Picking and packing process
- Recap of collaborative work carried out with SCAU –  
Postharvest laboratory and Guangdong Inspection and  
Quarantine Technology Centre
- Australian industry response to project recommendations
- Future collaborative project recommendations

# 澳大利亚荔枝产区

## Australian lychee production areas

年产量 3,500 至 4,000 吨 Production is 3,500 to 4,000 t/annum



该产业由大约200个小型农场构成。其分布于昆士兰的东海岸和新南威尔士。从纬度从16°到32°

The Australian lychee industry is composed of approximately 200 small farms distributed along the east coast of Queensland and NSW from Cooktown (16°S) to Coffs Harbour (32°S)



# 澳大利亚荔枝品种

## Australian lychee varieties

Bosworth 3 (B3) also  
known as Kwai Mai Pink  
粉红桂味

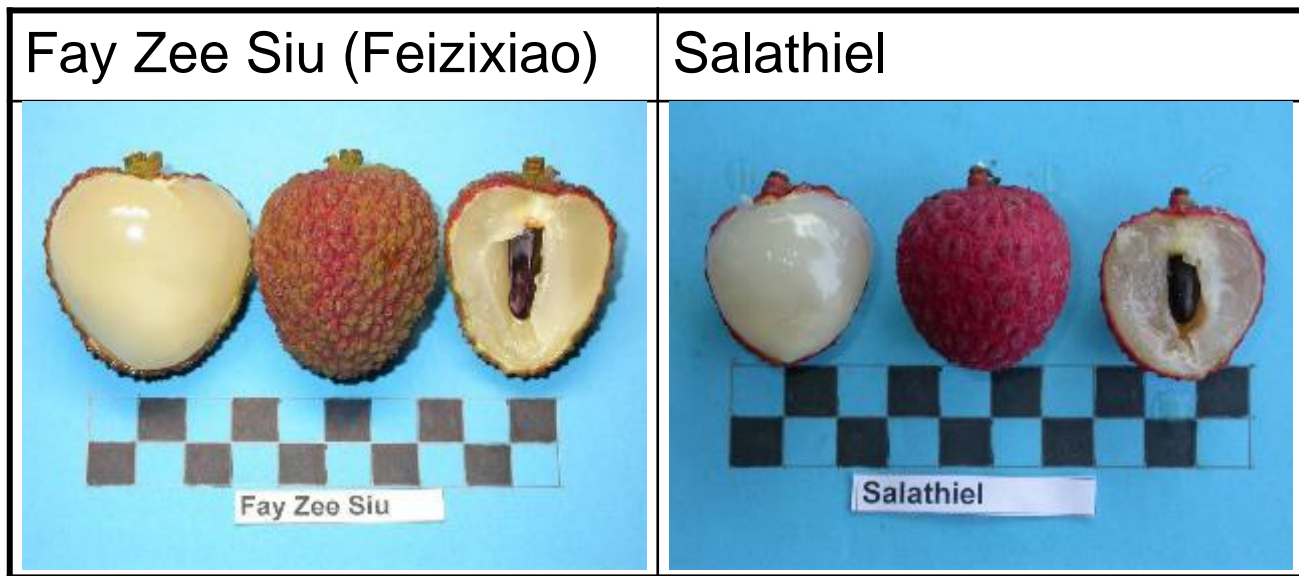


Tai So  
大造



# 澳大利亚荔枝品种

## Australian lychee varieties



# 澳大利亚荔枝品种

## Australian lychee varieties

Souey Tung

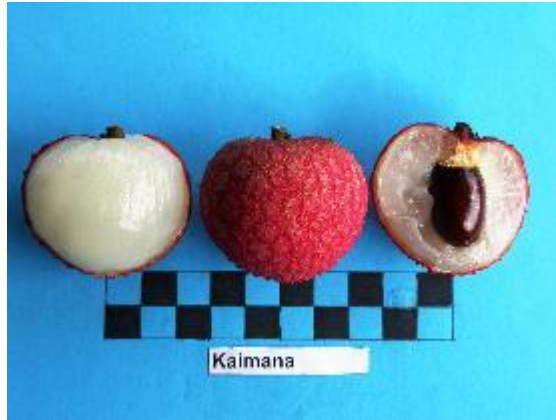


Wai Chee





# Other Varieties produced in Australia



# 典型的采摘体系Typical picking and packing system











# 中澳出口荔枝的检疫处理 与供应链研究

Quarantine and Supply Chain for Export Lychee  
(Litchi) between China and Australia

- Department of Agriculture and Fisheries, Queensland
- Guangdong Inspection and Quarantine Technology Centre
- Guangdong Province Key-Laboratory for Postharvest Technology of Fruit and Vegetables, South China Agricultural University



Australian Government

Department of Agriculture, Fisheries and Forestry



广东检验检疫技术中心

Guangdong Inspection and Quarantine Technology Center



华南农业大学

South China Agricultural University



## Irradiation

- 0, 200, 400, 600 & 800 Gy



## VHT

- 15 min  $\geq 47^{\circ}\text{C}$

## Cold Storage

- 1, 3, & 5°C
- 12 and 18 days







# 研究结果

## Results of the research

- 研究结果因产地和品种而异  
Results varied with variety and country
- 冷处理后18天大部分果实褐变  
18 day cold treatments resulted in fruit browning
- 低剂量的辐照(200 to 400 Gy)处理和蒸热处理对果实损伤最小  
Low levels of irradiation (200 to 400 Gy) and VHT resulted in the least damage to fruit
- 冷处理的结果不稳定，所设的不同温度间的差异没规律  
Cold treatments gave variable results which were not consistent with temperature differences
- 维C在冷处理18天后迅速降低  
Fruit Vit C levels were less in 18 day cold stored fruit

# 项目组向澳大利亚业界提出的建议

## Project team recommendations to the Australian industry

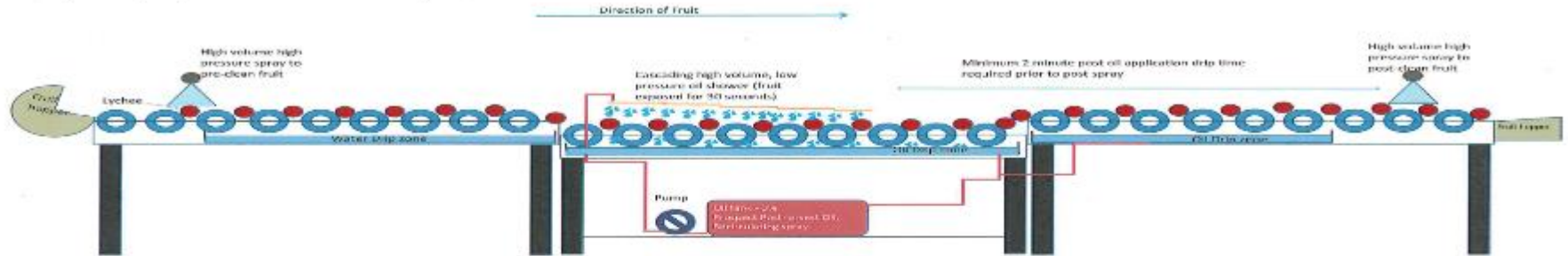
- 有出口处理要求的荔枝应在果场内直接分选  
Export fruit requiring disinfestation should be sourced directly from the farm
- 在批发市场中分选的荔枝只能供非检疫要求的地区  
Fruit on the wholesale market floor should only be sourced for export to non quarantine ports
- 生产商应改良在加工棚清洗的环节   
Growers to improve in line fruit washing in the shed
- 确保符合QA和ICA规定  
Ensure adherence to QA and ICA regulations

# Why in line fruit washing?

- Stem and flower debris
- Surface insects, eg scale and mealybugs or micro-lepadoptera eggs and larva



Draft Lychee prospect oil treatment conveyor



Evaluate the effectiveness of;

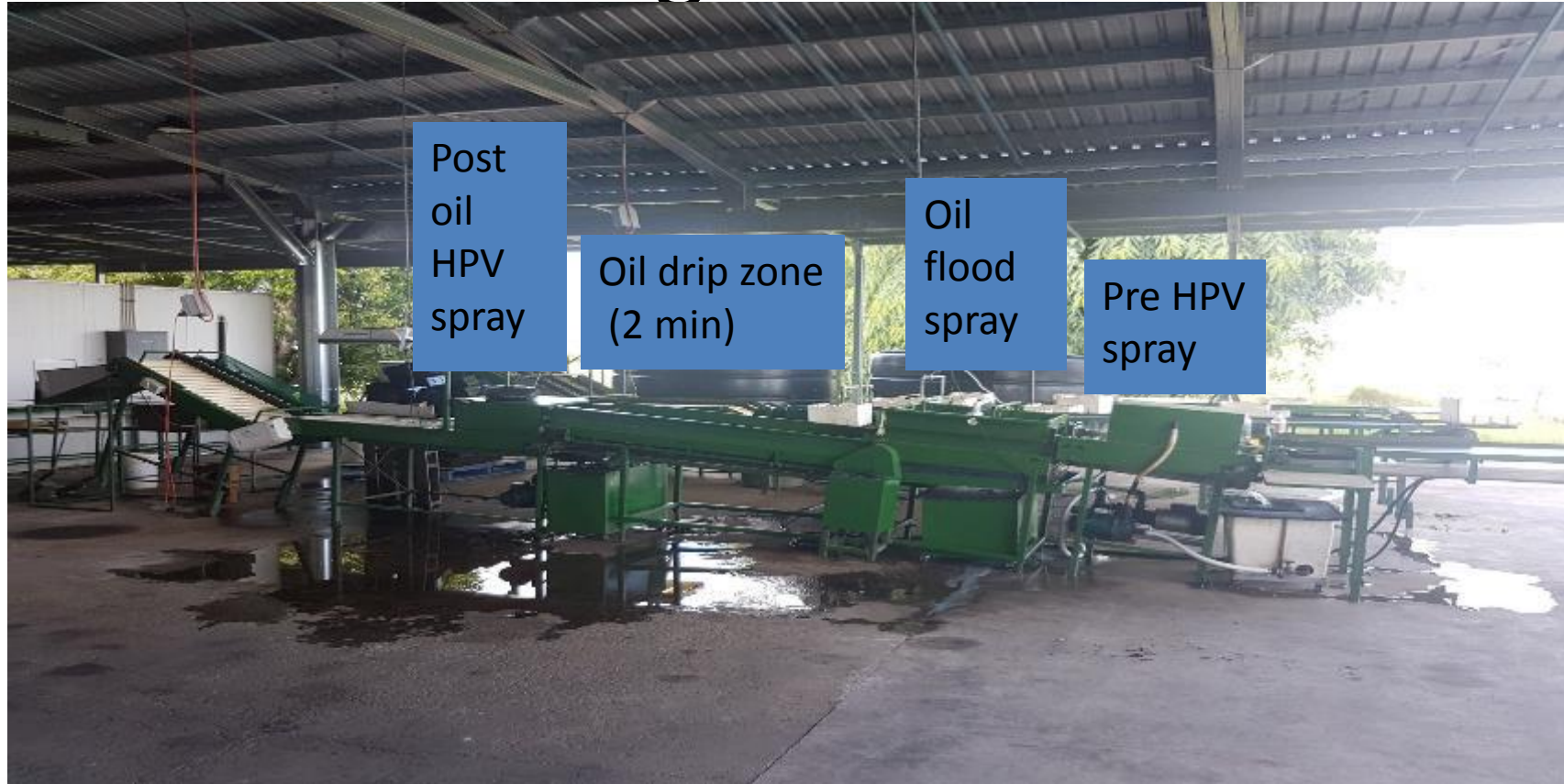
- Pre HP wash
- Oil flood spray + post HP wash
- Pre HP wash + Oil flood spray + post HP wash



# Fruit washing trials - DAF



# Fruit washing trials - Commercial



# Debris and passenger insect reduction

- Pre HP wash + Oil flood spray + Post HP wash
  - Over four trials (different orchards)
  - 93.5% reduction
- Next step is to examine the effect of increasing water pressure and exposure time

# Future collaboration suggestions

- Lychee Variety confirmation
  - DNA analysis and comparison of Australian grown varieties with the original Chinese germplasm.
- Post harvest “red life” and fruit quality.
  - “Fresh is best”

# Summary

- Australia's lychee farms are isolated
  - Our main export variety is KMP
- Collaborative quarantine/fruit quality work indicated VHT and/or irradiation as preferred methodologies
  - Irradiation treatment is ideally suited to the nature of our industry and current markets (airfreight fruit)
- Future R&D collaborative projects
  - Confirmation of lychee varieties against Chinese reference collection
  - Export postharvest “red life” and fruit quality research



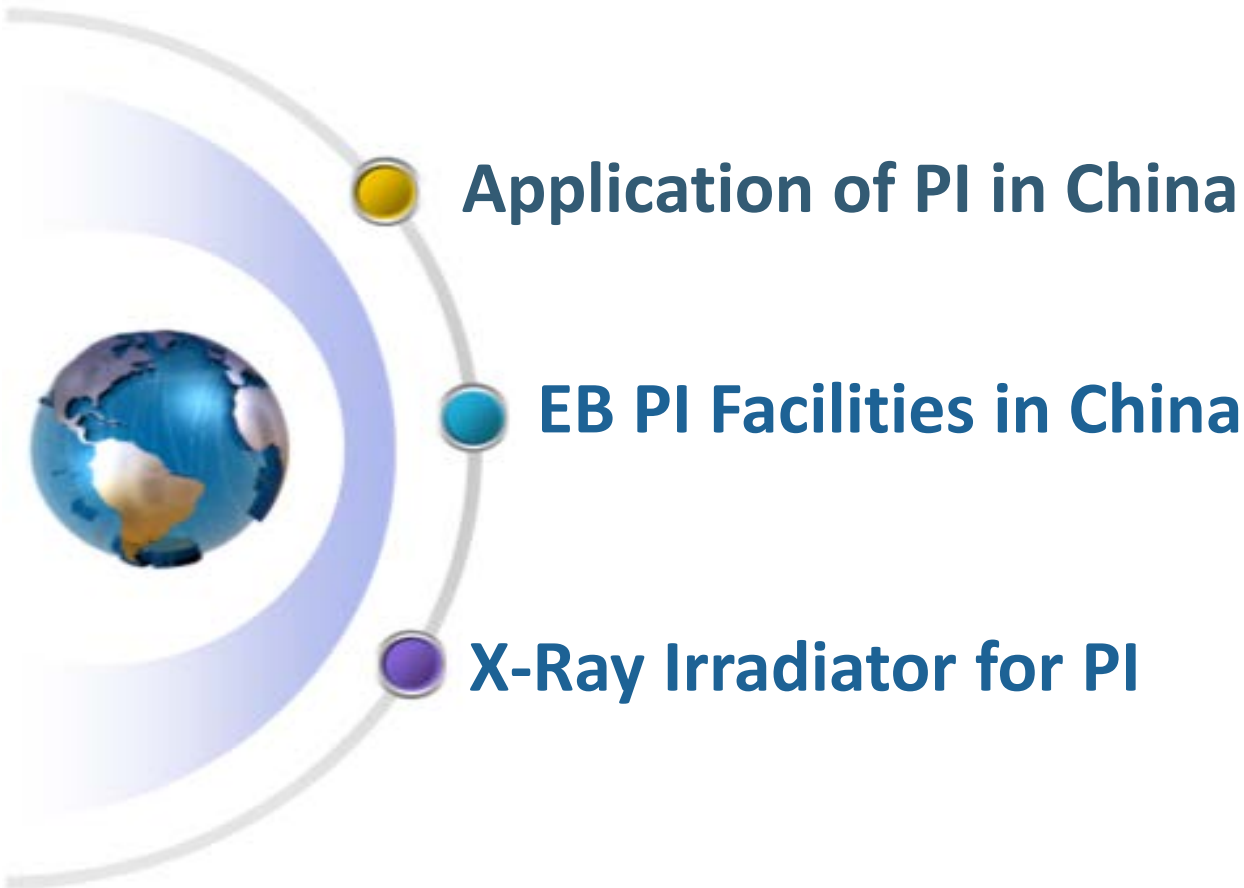
*Eighth Annual Chapman Phytosanitary Irradiation Forum, Bangkok,  
Thailand, June 13-15, 2018*

# Progress of Phytosanitary Irradiation Facility in China

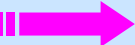
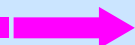


Huang Ming  
NUCTECH COMPANY LIMITED  
June 18, 2018

# Content



# Study on irradiation treatment for fruit insects in China

- Study on fruit insects:  minimum dose
  - Fruit fly
  - Fruit borer
  - Fruit mites; Gray Pineapple Mealybugs
- Study on fruit quality:  maximum dose
  - apple, mango, pitaya, guava, wax apple, etc.
  - Test items:
    - Appearance: visual determination
    - Chemical indicators: sugar, acid, vitamin

# Phytopsanitary Irradiation in China

- **Convert ISPM No.18 to Chinese National Standard GB/T21659-2008**
- **Standard and Operation Guide of phytopsanitary irradiation has been published**
- **The government is developing the phytopsanitary irradiation , building Laboratories and Demonstration projects**
- **Applications of imported fruit treatment**
- **NOT YET: sign any bilateral agreements with other countries on phytopsanitary irradiation**

# Irradiation Treatment of imported fruits in China

- **MOA Standard (Ministry of Agriculture):**
  - **NY/T 2319-2013** *“Guide for the irradiation of tropical fruits in electron beam irradiation facility”*
    - ◆ This standard specifies the technical requirements before, during and after irradiation process. Also storage and labeling specifications.
    - ◆ Applies to electron beam radiation treatment for quarantine purpose: mango, wax apple, Annona, guava and carambola and other tropical fruits
- **For some types of quarantine pests found in imported fruit: can be send to some designated agencies in China for irradiation treatment then allowed to enter Chinese market**



# Example

- A company in Shanghai was selected as demonstration unit for irradiation treatment
- Standard of Shanghai CIQ; *procedure of irradiation treatment for fruits and vegetables*
- Irradiation treatment of imported fruit 280000kg in 2008-2011



# Standards Established (National)

- GB 14891.5-1997: Hygienic standard for irradiated fresh fruits and vegetables
- GB 18524-2016 National standard for food safety:  
Hygienic standard for food irradiation processing
- GB/T21659-2008: Guidelines for the use of Irradiation as  
a phytosanitary measure

# Standards Established (Professional)

- SN/T 3707-2013 Irradiation as a phytosanitary treatment for *Dysmicoccus neobrevipes* Beardsley in banana
- SN/T 4070-2014 Minimum Absorbed Dose for the Phytosanitary Irradiation of *Bactrocera dorsalis* in Mango and Litchi
- SN/T 4071-2014 Technical Requirements for Phytosanitary Irradiation of *Bactrocera dorsalis* in Wax-apple and Papaya Fruits
- SN/T 4330-2015 General requirement of quarantine treatment of entry fruits
- SN/T 4331-2015 Basic requirement for Phytosanitary treatment of importing fruits
- SN/T 4409-2015 Irradiation treatment for *Cydia pomonella*
- SN/T 4409-2015 Irradiation treatment for *Grapholitha molesta* Busck
- SN/T 4980-2017 The Minimum Absorbed Dose for Phytosanitary Irradiation Treatment against *Carposina sasakii*, *Bactrocera tau*, and *Pseudococcus jackbeardsleyi*

# Standards under development (Professional)

- Operational Rules for Phytosanitary Irradiation Treatment Using Electron Beams
- Minimum Absorbed Dose for the Phytosanitary Irradiation of *Bactrocera correcta*
- Minimum Absorbed Dose for the Phytosanitary Irradiation of *Dysmicoccus lepelleyi*
- Technical Schedules for Phytosanitary Irradiation Treatment of *Planococcus lilacius* in Fruits



# Content



Application of PI in China

EB PI Facilities in China

X-Ray Irradiator for PI



# Electron Beam Phytosanitary Irradiation Facility in China

- Phytosanitary irradiation and detection lab in TJCIQ
- CHINA-ASEAN Pingxiang Fruit Phytosanitary Irradiation

Processing Center



# Phytosanitary irradiation and detection lab in TJCIQ

——NUCTECH™ IS0705 E-Beam Irradiation Phytosanitary & processing System

- Key Laboratory of CIQ
  - ◆ Application: Research, confirmatory tests, and small scale PI , also capable of irradiation processing
  - ◆ Hosted by: Tianjin CIQ
  - ◆ Location: Tianjin, Operation since 2009

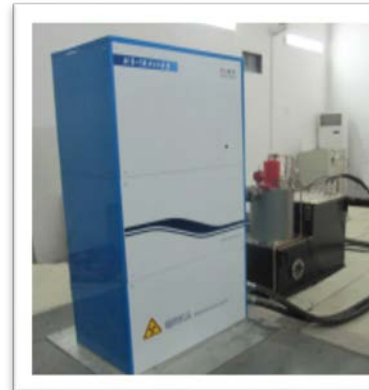


# Phytosanitary irradiation and detection lab in TJCIQ

## —NUCTECH™ IS0705 E-Beam Irradiation Phytosanitary & processing System

### ■ Parameters:

- ◆ 7.5MeV LINAC
- ◆ 0.25~5kW (tunable) , very wide range!
- ◆ 40Gy~20kGy/single E-Beam irradiation
- ◆ Can be converted to X-ray irradiation



# CHINA-ASEAN Pingxiang Fruit Phytosanitary Irradiation Processing Center

## Pingxiang Port



- China largest import and export ports for ASEAN fruits, the border of China and Vietnam
- A large amount of fruits from Viet Nam through Pingxiang Port
  - dragon fruit, mango, rambutan, longan, litchi and banana.....
- The variety and quantity of dangerous exotic pests are increasing rapidly
- A great threat to the regional fruit and vegetable planting industry

# CHINA-ASEAN Pingxiang Fruit Phytosanitary Irradiation Processing Center

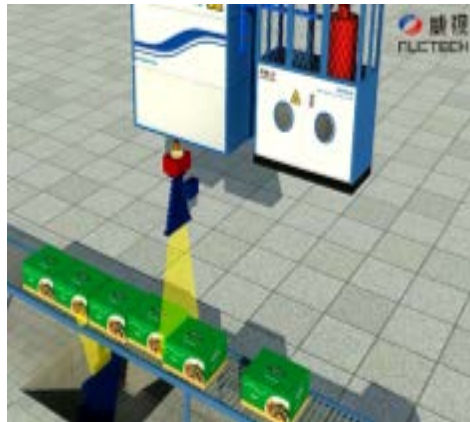
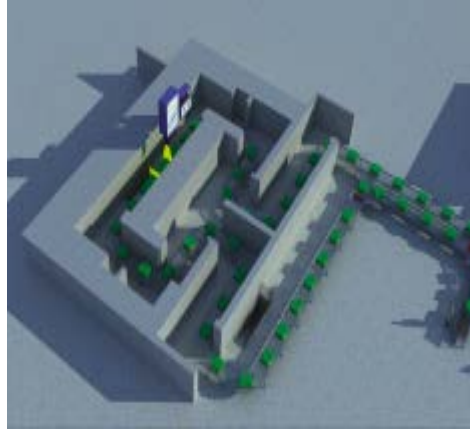
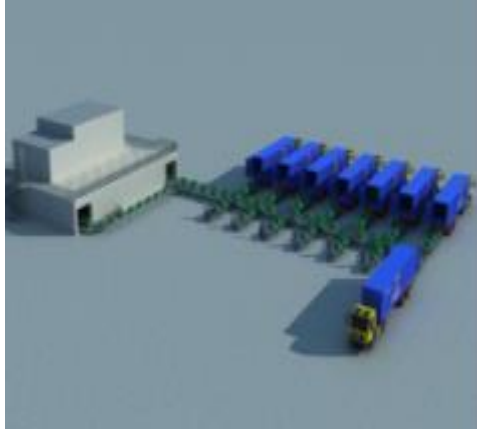
- Since 2010, a new China - ASEAN fruit trade zone in Pingxiang planning and construction
- EB irradiation technology suitable for Phytosanitary treatment in Port
- Joint construction by Chinese Academy of Inspection and Quarantine, Guangxi government, Tsinghua University and NUCTECH
- NUCTECH™ IS1007D E-Beam Irradiation Quarantine System
- The facilities have been passed the acceptance since the beginning of 2016
- Now in experimental running status





# EB Irradiation Facility

## Nuctech™ IS1007D EB irradiation system



- Two accelerator irradiate from the top and bottom of the goods, respectively
- Direct docking up to  $7 \times 2$  vehicles and equipment system
- Precise delivery is guaranteed with advanced management software

# EB Irradiation Facility

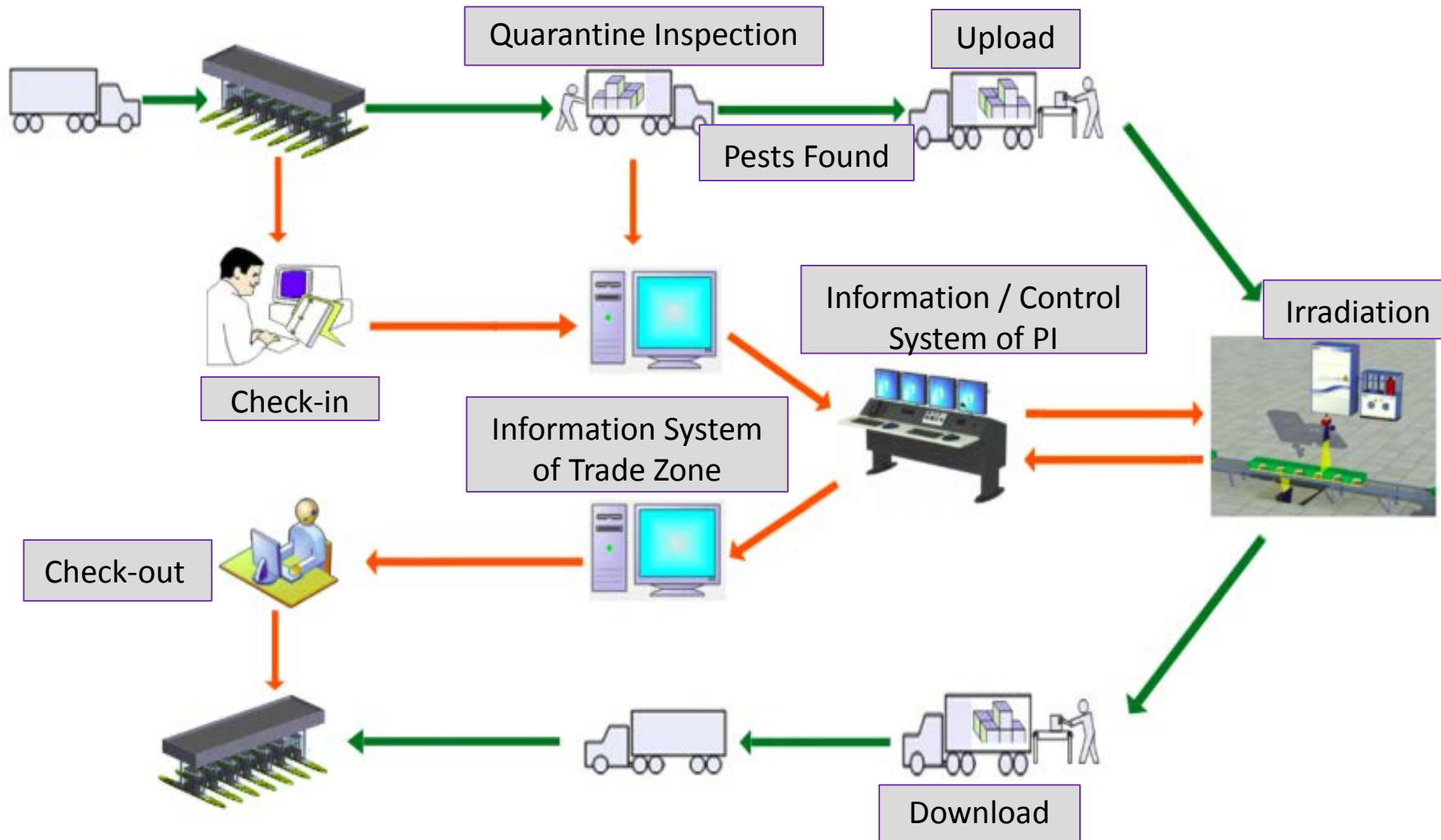


Parameters	Objects
Number of sources	2 LINACs
Beam energy	10MeV
Max. beam power per accelerator	7.5kW
scanning width	82cm
surface scanning uniformity	<5%
Conveyor speed under beam	8~200mm/s
speed Accuracy of the conveyor under beam	<0.5%
surface Dose range per single irradiation	200Gy~18K Gy
Output	20 ton/h

# EB Irradiation Facility



# Planning of Quarantine Business In the Trade Zone



# Project Status

- Now The EB Phytosanitary Irradiation Center is in experimental running status, due to:
  - Some unfinished infrastructure in the trade zone, including part of the construction, management system and so on
  - The technical standards and regulations of Phytosanitary Irradiation are setting up



# Ongoing work

## 1. Confirm quarantine pests species and minimum dose

Quarantine pests (intercepted in 2015)	Batch
<i>Bactrocera correcta</i>	71
<i>Bactrocera cucurbitae</i>	59
<i>Bactrocera dorsalis</i>	976
<i>Bactrocera invadens</i>	34
<i>Dysmicoccus neobrevipes</i>	168
<i>Planococcus lilacius</i>	78
<i>Planococcus minor</i>	1815
<i>Pseudococcus longispinus</i>	73
<i>Sternochetus frigidus</i>	31
<i>Sternochetus mangiferae</i>	369
<i>Sternochetus olivieri</i>	246

- For pests within standard, carry out the validation and pilot-scale processing on-site.
- For pests without standard, research on minimum dose
  - Confirm the most tolerant insect states
  - Dose-response to confirmatory tests
  - laboratorial experiment and pilot-scale processing on-site.

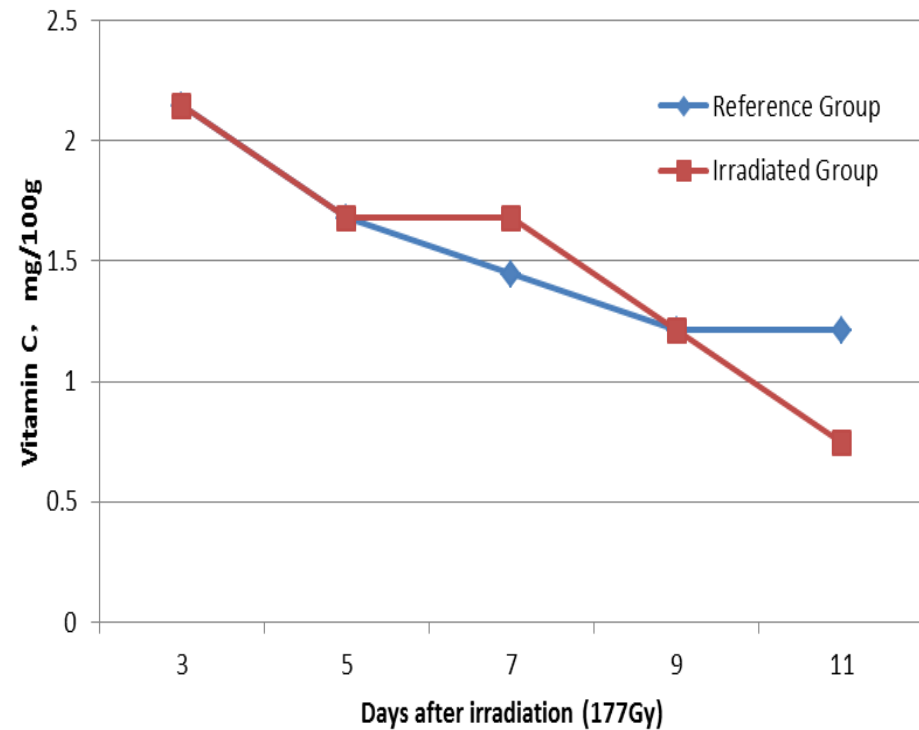
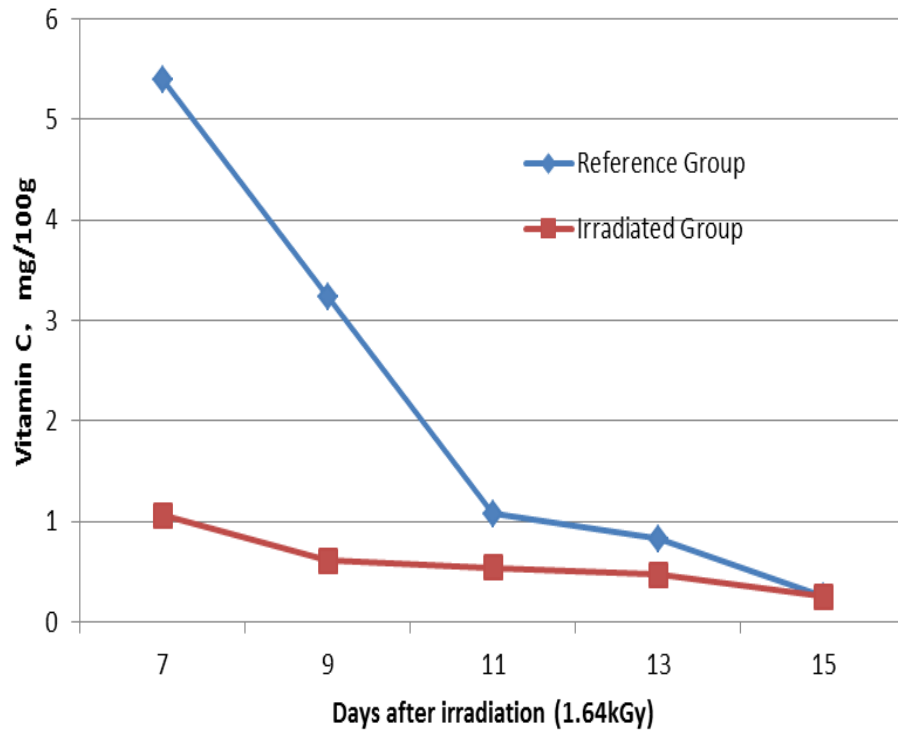
# Ongoing work

## 2. Fruits Tolerance to Radiation and Quality Tests

- Varieties: dragon fruit, mango, rambutan, longan and litchi
- Quality testing items
  - sensory characteristics
  - physicochemical indexes: sugar, acid, vitamin C ...



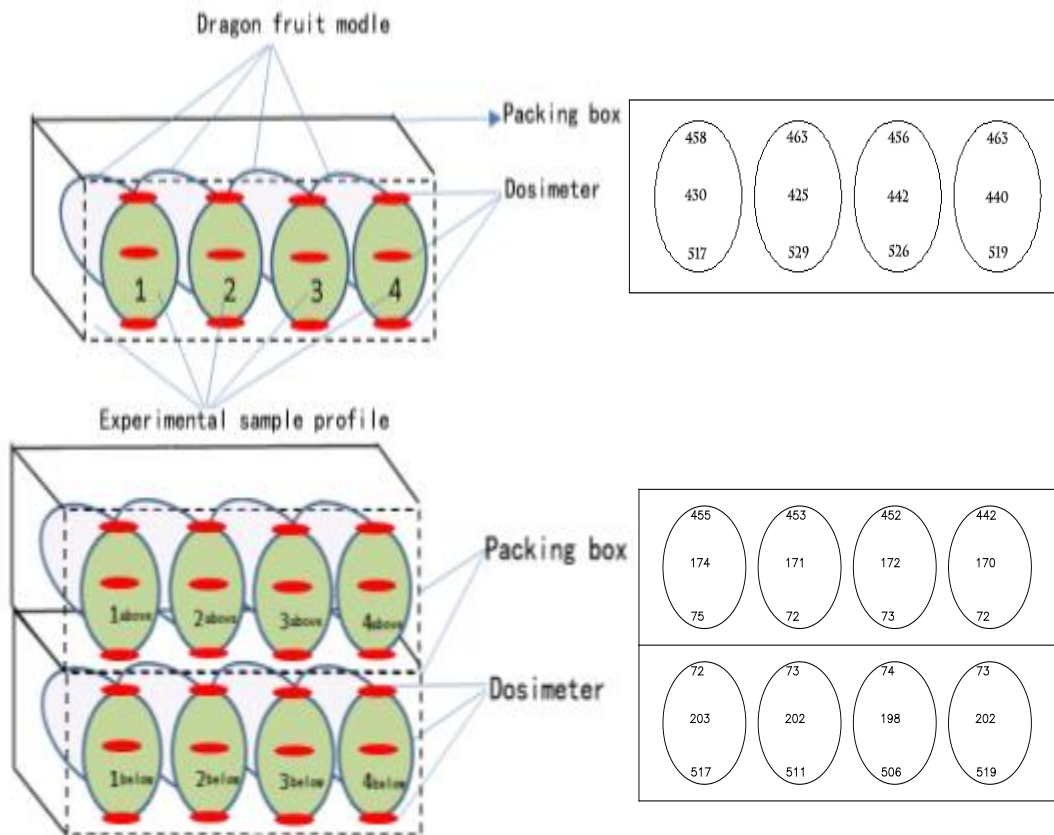
# Variation of VC in Dragon Fruit after irradiation



# Ongoing work

## 3. Fruit Packing and Dose Distribution

Case: Packing within one layer or two layers dragon fruit and dose distribution (Under 5.4kW, 200mm/s)



- ◆ One layer: DUR ca. 1.5;
- ◆ Two layers: DUR~6, only available when min-dose about 100Gy



# Ongoing work

## 4. Regulations / Specifications

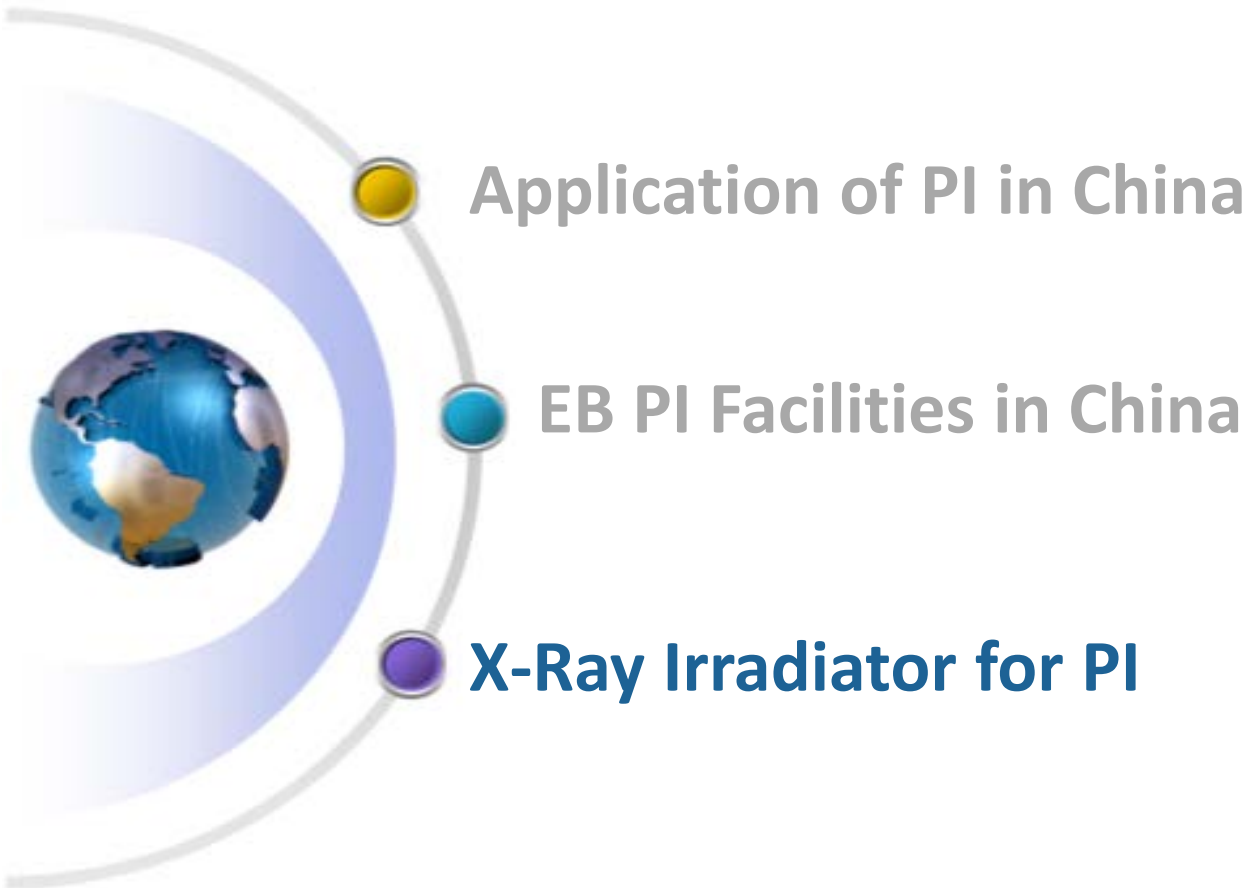
- Technical regulation for phytosanitary treatment of ASEAN border trading fruits using EB irradiation
- Supervision regulation of EB phytosanitary irradiation for ASEAN (Viet Nam) border trading fruits
- 3~5 items: Code of good phytosanitary irradiation practice for .....(dragon fruit, mango, rambutan, longan and litchi )



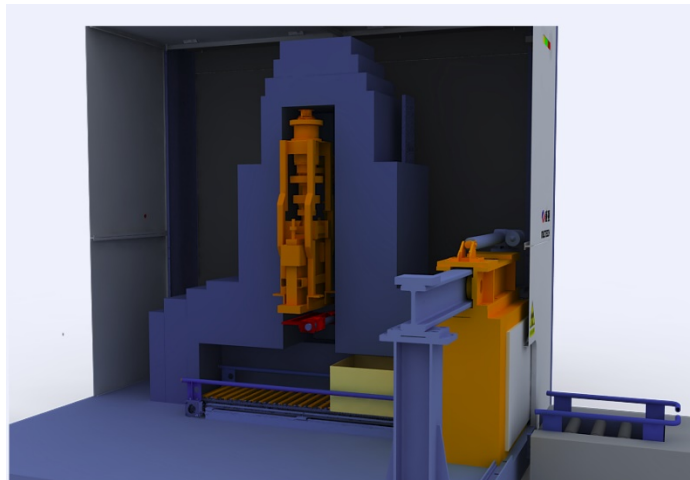
# Challenge and Prospect of the PI Project

- Still a lot research and regulation work to do
- The public's acceptance of fruit's phytosanitary irradiation
- Promote the development of border trade between China and Vietnam
- As a good demonstration for PI in China, this project will vigorously promote the practical application, as well as the implement of technology and standards

# Content



# EB/X-Ray Dual Irradiation System



- For scientific research and application
  - Sterile insect technique
  - PI experiments
  - Seed/seedling breeding
  - Sterilization of small-scale items
  - etc.
- Self-shielding, miniaturized instrument
- 2.5MeV/1kW; EB/X-ray, dual source
  - X-ray : a dose rate of 10 to 250 Gy/min; minimum throughput 3,000 L·Gy/hr
  - E-beam: 4~35kGy once
- $<2.5 \times 2.5 \times 2$  m (w×d×h)

# X-Ray Irradiation System



- For scientific research and application
  - Sterile insect technique
  - PI experiments
  - Cell irradiation research
  - etc.
- Self-shielding, miniaturized instrument
- 160kV/6~12kW; X-ray source
  - Dose rate : 3~250Gy/min
  - Output  $\geq 1,500 \text{ L} \cdot \text{Gy} \cdot \text{hr}^{-1}$  (@100Gy,  $0.45 \text{ g} \cdot \text{cm}^{-3}$ ,  $U < 1.3$ )
- $1.2\text{m} \times 0.9\text{m} \times 1.9\text{m}$  (w  $\times$  d  $\times$  h)



Thank you for  
your attention!





# The production and uses of litchis in China

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Chen Houbin

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<sup>2</sup>College of Horticulture, South China Agricultural University, Guangzhou 510642

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E-mail: [hbchen21@hotmail.com](mailto:hbchen21@hotmail.com);  
[hbchen@scau.edu.cn](mailto:hbchen@scau.edu.cn)



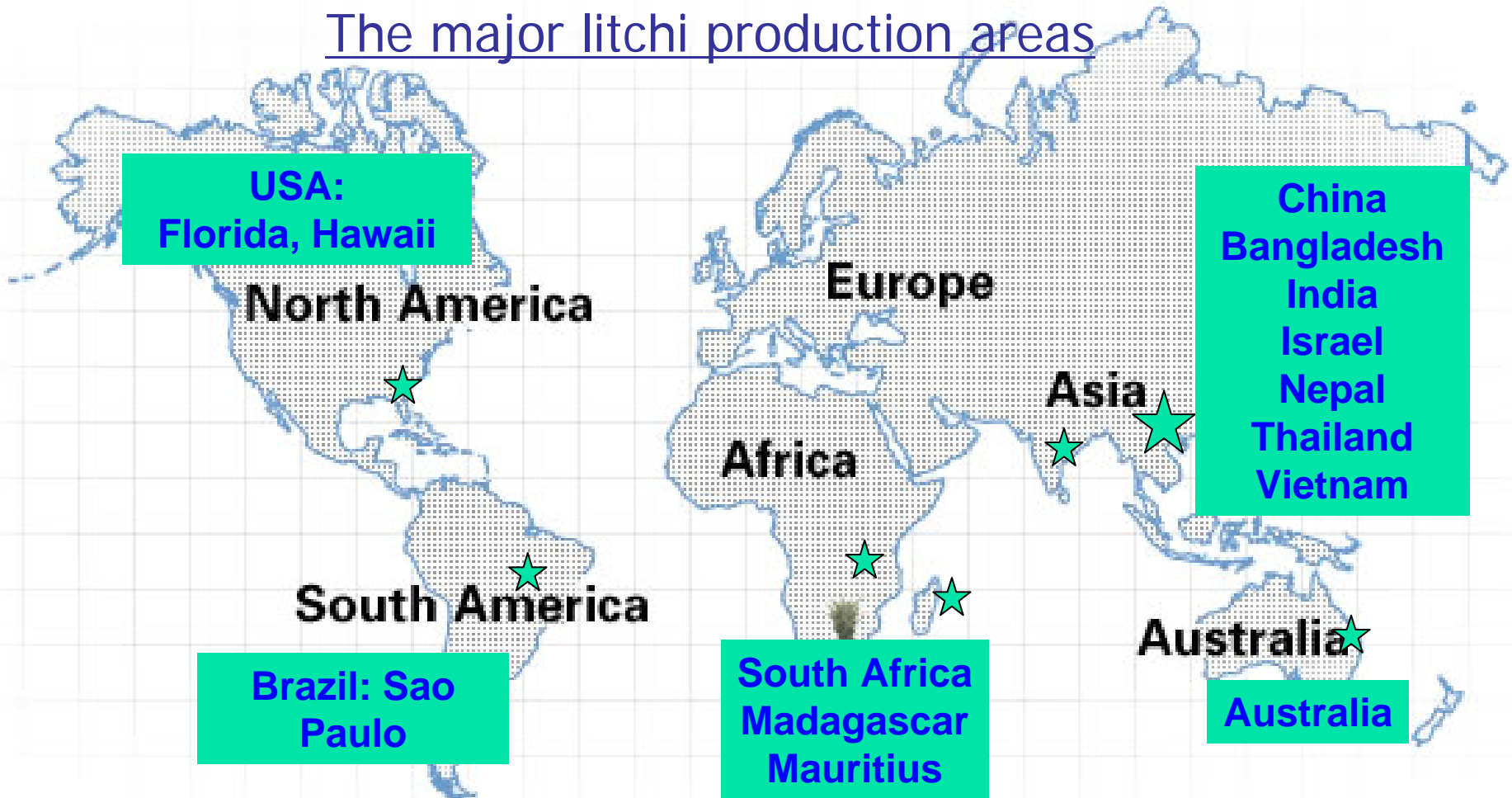
# Guidelines

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- 1. Production status of litchi
- 2. Major litchi cultivars and their uses
- 3. Major constraints
- 4. Our efforts

# 1. Production status of litchi

## The major litchi production areas



# The world litchi production(2003)

- Australia: 1600hm<sup>2</sup>, 4000t
- Bangladesh: 4800hm<sup>2</sup>, 13000t
- **China mainland: 580,000hm<sup>2</sup>, 1,558,400t(2004) ,66.33%**
- China Taiwan: 12000hm<sup>2</sup>, 110,000t
- India: 62,000hm<sup>2</sup>, 520,000t
- Madagascar: 3000hm<sup>2</sup>, 30000t
- Nepal: 2400hm<sup>2</sup>, 14000t
- South Africa: 2000hm<sup>2</sup>, 8000t
- Thailand: 24,000hm<sup>2</sup>, 82000t
- Vietnam: 12,000hm<sup>2</sup>, 10,000t
- World total production: 2,349,400t

(Source: Julian, 2004; Yen, 2004; Huang, 2004;  
Mitra, 2004; Hoa, 2005)

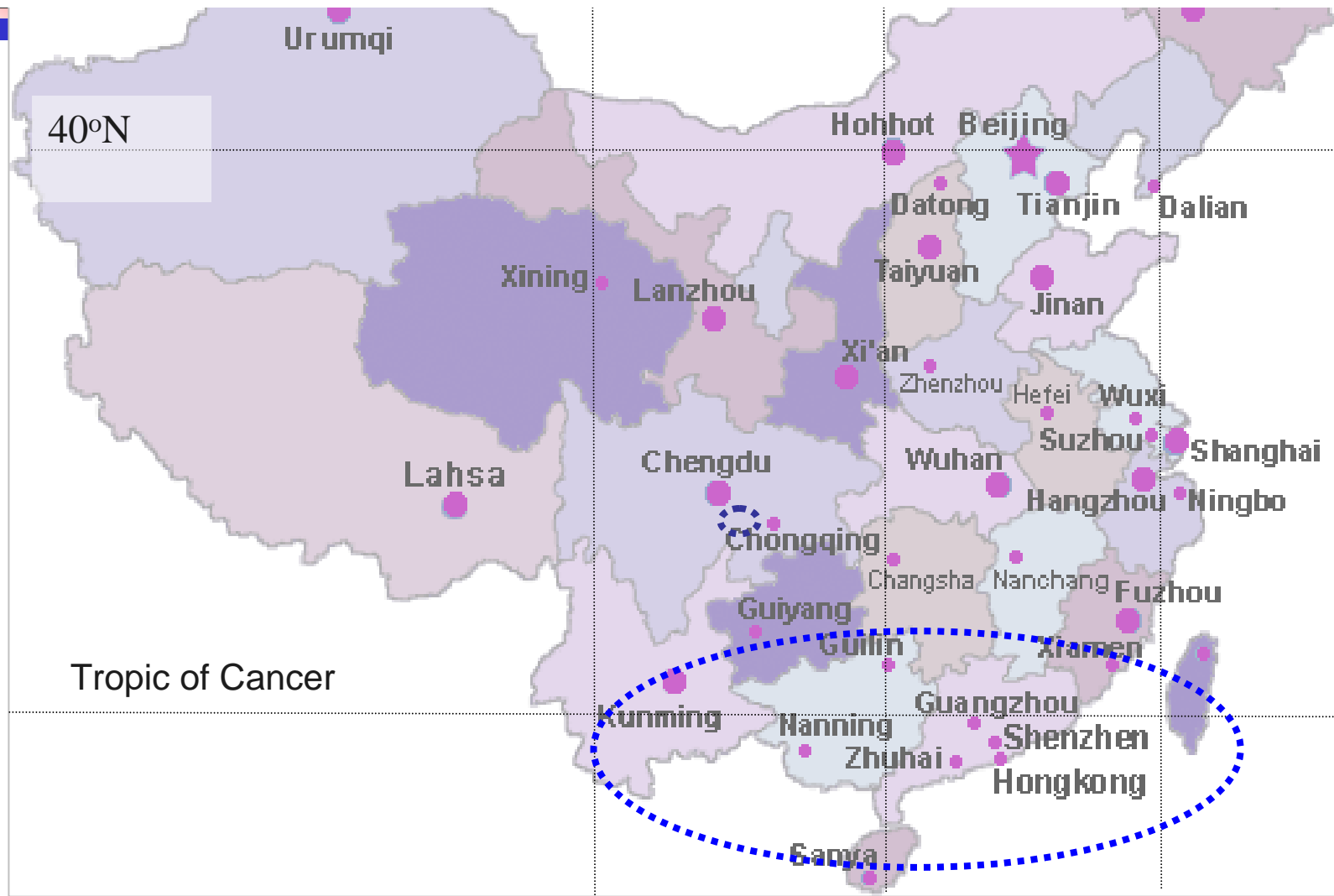
100°E

110°E

120°E

China is the origin and the biggest producer of litchi fruit. Litchis are commercially growing in Guangdong, Guangxi, Hainan, Fujian, Yunnan and Sichuan.

iversity



# Litchi production in China

year	2000	2001	2002	2003	2004	2005	2006
Planting area/hm <sup>2</sup>	590750	584372	570836	559100	599922	580800	580000
Fruiting area/hm <sup>2</sup>	263879	296273	337910	311187	197284	--	--
Production /000 tons	891.9	958.7	1523.3	1123.8	1558.4	1350.0	144.0
Yielding on fruiting area (kg/hm <sup>2</sup> )	3380	3240	4510	3610	7899	--	--



- Number of litchi farmers: estimated 600,000.
- Size of litchi orchards: 0.1 ~ 10hm<sup>2</sup>
- Employment: 1.8 million labors

# Litchi export and import in China (Yi,2004)

Year	Export amount/t	Export value /000USD	Import amount/t	Import value /000USD
1995	6831.8	3710.75	311.4	568.84
1996	2577.4	2314.17	1277.5	3153.78
1997	6216.3	4787.67	699.9	1826.97
1998	2902.6	2989.84	256.9	597.86
1999	6720.3	12762.82	2444.5	6752.28
2000	4336.7	2827.83	4125.0	10156.36
2002	41733.2	6962.0	3172.0	8431.5
2003	11301.7	4051.73	9923.7	2358.37
2004	47397.5	9652.77	54501.1	5455.58

The most important litchi areas are west Guangdong and south-east Guangxi

Guangxi-Qin Zhou 94000hm<sup>2</sup>, 138,000t;  
Yulin 76000hm<sup>2</sup>, 58000t;  
Guigang 22000hm<sup>2</sup>, 40000t;  
Nanning 17400hm<sup>2</sup>, 38000t.  
Subtotal: 29,800hm<sup>2</sup>, 276,000~400,000t.

Fujian-39200hm<sup>2</sup>, 162,000t;  
East Guangdong-60,000hm<sup>2</sup>, 170,000t.  
Subtotal: 99200hm<sup>2</sup>, 332,000t.

376,500hm<sup>2</sup>, 64.8%,  
932,400t, 64.3%.

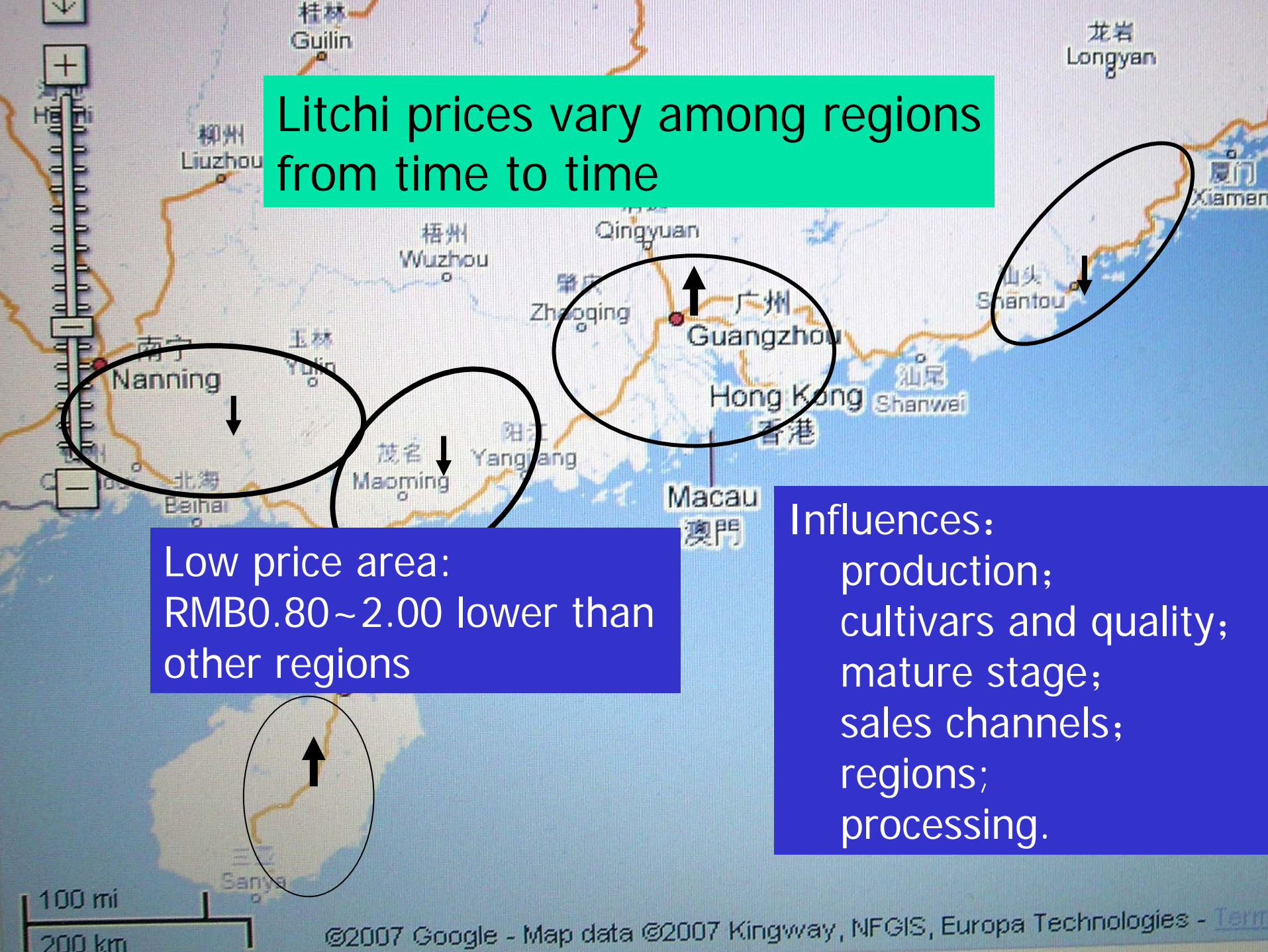
West Guangdong-  
Maoming: 111,000hm<sup>2</sup>,  
Yangjiang: 37,600hm<sup>2</sup>, 87,200t;  
Zhangjian: 17,900hm<sup>2</sup>, 66,800t.  
Subtotal: 166,500hm<sup>2</sup>, 532,400t.

Mid Guangdong-  
Guangzhou: 34500hm<sup>2</sup>, 40,500t;  
Dongguan: 5400hm<sup>2</sup>, 8600t;  
Shenzhen: 6700hm<sup>2</sup>, 7900t.  
Subtotal: 46,600hm<sup>2</sup>, 57,000t.

Hainan: 32,400hm<sup>2</sup>, 80000t.



Litchi prices vary among regions  
from time to time



Low price area:  
RMB0.80~2.00 lower than  
other regions

Influences:  
production;  
cultivars and quality;  
mature stage;  
sales channels;  
regions;  
processing.



# Litchi processing capacity in major areas: About 90,000t, 7.8%

Production: 274000t;  
Canning and juices: 20000t, 5%

Production: 160,000t;  
Canning: 20,000t, 12.5%

Production: 68,000t;  
Drying: 5000t, 7.3%

Production: 550,000t  
Drying and wine: 45,000t, 8.1 %

Production: 80000t  
No processing.



## 2. Major litchi cultivars and their uses

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- The major cultivars
  - Early: Sanyuehong, Baitangying, Baila, Feizixiao,
  - Mid: Feizixiao, Heiye
  - Late: Guiwei, Nuomici, Huaizhi, Shuangjianyuhebao

- The production areas:
  - Early: Hainan, west Guangdong
  - Mid to late: middle and east Guangdong, Guangxi, south Fujian
  - Late to very late: north Fujian, Sichuan





BL

BTY

FZX

HY

Baitangying

Feizixiao

Heiye

Baila



Sanyuehong





**Nuomici (No Mi Ci)**

60,000hm<sup>2</sup>(10.3%), late.  
Excellent eating quality.  
For fresh and drying.  
Susceptible to fruit cracking,  
Difficult to keep and transport

**Guiwei (Kwai May)**

60,000hm<sup>2</sup>(10.3%), mid to late.  
Excellent eating quality.  
For fresh and drying.  
Difficult to keep and transport.





### **Huaizhi (Wai Chee)**

190,000hm<sup>2</sup>(32.7%), late,  
 Regular bearing and high yielding,  
 Good quality, clean flesh,  
 Easy to store and transport,  
 For export and for canning and jam

### **Heiye (Hak Yip)**

205,000hm<sup>2</sup>(35.3%), early,  
 Regular bearing and high yielding  
 Good quality,  
 Easy to store and transport  
 For export and for canning and juices.





Flesh color impacts litchi processing



2007.07.01



2007.07.01



2007.07.01



2007.07.01



## 3. Major constraints

---

- Supply over demand
  - Limited overseas market: 25,000t (Julian, 2004)
  - Limited consuming population
  - Limited transportation capacity
- High cost and low profit
  - High labor cost;
  - Low yield;
  - Low price of fruit.

- Lack of infrastructures
  - Irrigation and fertilization system;
  - Cold chain especially cold rooms;
  - Processing facilities.
- Lack of bank supporting system
  - For orchard management;
  - For post-harvest handling and processing.
- Safe environment and safe products
  - Pests and diseases
  - Chemical residues



# Major pests and diseases in litchi

- Pests: more than 120 species
  - Litchi stem-end borer (*Conopomorpha sinensis* Bradley)
  - Litchi stinkbug (*Tessaratomia papillosa* Drury)
  - Thrips
  - Scales
  - Litchi hairy mite (*Aceria litchii*)
- Diseases
  - Litchi downy blight disease
  - Anthracnose

**Litchi stem-end borer**  
*Conopomorpha sinensis* Bradley







# Litchi stinkbug

*Tessaratoma papillosa*, causing fruit drop





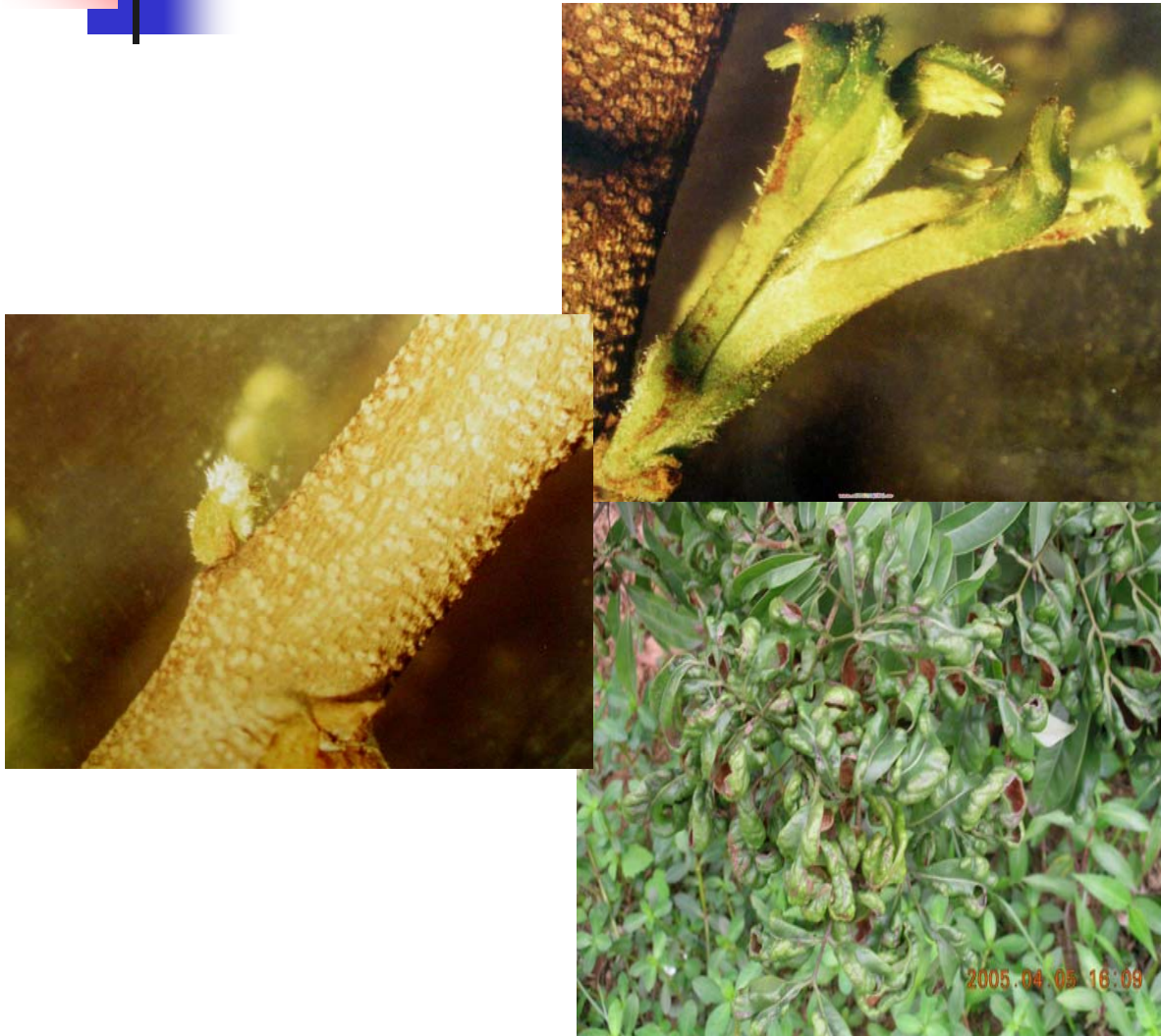
# Scales

## affecting leaf photosynthesis



# The litchi erinose mite, litchi hairy mite

*Aceria litchii*







*Bazura suppressaria*  
油桐尺蠖

## Thrips

*Selenothrips rubirocintus*

红带网纹蓟马



# Litchi downy blight disease

causing fruit drop, and affecting flowers and leaves





# *Colletotrichum gloeosporiodes*



Pepper spot: pre-harvest

Post-harvest





# Litchi export

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- Strict conditions for treatment.
  - To Europe: cold chain. by air, by ship
  - To southeast Asia and Canada: cold chain, by ship
  - To USA, Australia: 1.38°C for 18 days.
  - To Japan: Steaming until fruit core temperature of 48°C for 16min
- Certificated litchi farms.



## 4. Our efforts

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- Research funds:
  - 17.035 million yuan (USD2.12 million) were input from all levels of Chinese governments during 1996 and 2006.
  - 16.16 million yuan (USD2.15 million) has been planned from 2006 to 2010 from the state.



# Research and industry focus

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- Industry re-orientation
  - Increasing litchi processing especially juice making
  - Reducing tree numbers via thinning of trees
- Orchard re-construction
  - Simplifying cultivars
  - Installment of irrigation and fertilization systems
  - Construction of cold rooms
  - Construction of post-harvest treatment systems
- The integrated pest management (IPM)

# The integrated pest management (IPM)

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- Planting system:
  - inter-planted cultivars → single cultivars
  - densely planting → tree thinning
- Use of natural enemies
- Biological control combined with sound orchard management, eg. Pruning of infested branches or leaves.



# Chemical controls

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- During winter flushing period: suppression of leaf flushes, the overwintering insect and mite pests.
- During flowering period: control of litchi stinkbug, erinose mite, trichlorfon is used in combination with chlorbenside for downy blight disease two times.

- During fruitlet period: control of stem-end borer and litchi stinkbug, with cypermethrin or chlorpyrifos plus trichlorfon; Ridmil-MA or Sandofan for downy blight, until fruit maturation period.
- During autumn flushing period: protecting from stem-end borer, erinose mite, leaf midge and carious lepidopterous caterpillars, spray with isocarbophos or acephate, with 10-15 days apart.

# Control of major pests and disease

Pests and disease	Chemicals	Usage spraying with
Litchi downy blight disease	Mancozeb (Ridomil-MZ)	1030~1400 mg/kg 312.5 ~375 mg/kg
Litchi stinkbug	Cypermethrin	25~50 mg/kg
Litchi stem end borer	Chlorpyrifos+Cypermethrin	86.67~130 mg/kg

Excerpt from NY/T 5174-2002 Technical guidelines in litchi production  
China Agricultural Industry Standard, 2002



# The standards of chemical residues in litchi ('no-harm' food products)

	chemical	Standard/(mg/kg)
1	deltamethrin	$\leq 0.1$
2	fenvalerate	$\leq 0.2$
3	cypermethrin	$\leq 2$
4	cyhalothrin	$\leq 0.2$
5	trichlorphon	$\leq 0.1$
6	dichlorvos	$\leq 0.2$
7	dimethoate	$\leq 1$
8	amitraz	$\leq 0.5$
9	phosmet	$\leq 0.5$
10	chlorpyrifos	$\leq 1$

Excerpt from NY/T 5173-2002 No harm food Litchi.  
China Agricultural Industry Standard, 2002

# More and more use of natural enemies: spider, parasitic wasp, etc.





# Conclusions

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- 1. Litchi is one of the most important fruit crops in southern China, mainly relying on domestic market; main constraints for export are post-harvest treatment procedures and chemical residues.
- 2. Processing is an urgent solution for supply-over-demand issues in China's litchis.
- 3. Food safety issue may need comprehensive ways to tackle with.

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Australian Litchi Industry Development and Enlightenment to China (I)

Date: 2016-03-18 17:48 Author: Source: "World Agriculture" in 2015 on 08 hits:

Abstract: This article is based on the modern industrial technology system of litchi and longan, and the industrial economic team’s inspection of the litchi industry in Queensland, Australia. The specific content includes the basic situation of the Australian litchi industry, in-depth introduction of Australia’s litchi plantation farms, growers’ associations, sales organizations and litchi export and quarantine processes. On this basis, comparing the differences in litchi industry between China and Australia, China should learn from the experience of Australia’s industrial organization development and post-production processing. This paper proposes a place where Chinese litchi industry development can learn from Australia.

Key words: Australia, litchi industry, development, inspiration

1 The basic situation of Australian litchi industry

Lychee production in Australia is mainly distributed in the eastern coastal areas, starting 16 degrees south latitude south of Cooktown, Queensland, and south to 30 degrees south latitude south of Coffs Harbour, of which 60% is located in the subtropical region north of central Queensland.

Due to Australia’s lack of systematic records of litchi planting, production and prices, the mission failed to obtain accurate data on the litchi industry. Christopher (2002) mentioned that there are about 320 litchi growers in Australia, producing about 3,500 tons of lychee, acreage of about 1500hm2, and production value of 15 million Australian dollars (1 Australian dollar is about 4.91 yuan, 2015), and showing a steady upward trend. . In terms of regional distribution, about 50% of litchi production is concentrated in northern Queensland, 40% in central and southern Queensland and 10% in northern New South Wales.

Since Australia is located in the southern hemisphere, from north to south, with the increase of latitude, the ripe season of litchi has come one after another. Litchi harvest season lasts for about 4 months from October of each year to March of the following year. This also led to an inverted U-shaped curve for the price of Australian litchi over time. The price of litchi was very high in the early northern markets. With the increase in the quantity of litchi, prices dropped. In the late period of the southern litchi market, the price has risen with the decline in the number of listed products. On February 3, 2015, the team visited the supermarket in Brisbane and saw that the price of litchi was AUD 12.9 per kilogram. The sale was not good. Mr. Yan, who was accompanied by the inspection, told the author that the earliest listed litchi price would be more than 20 Australian dollars per kilogram, but at the lowest it would fall to 4-5 Australian dollars per kilogram. With the increase of the listed quantity, the price would drop rapidly to the south, yield Decline, the price will rise again. Overall, there are significant differences in prices between different years in Australia and different listing periods. This is similar to the trend of China’s listed litchi and price changes from south to north.

There are more than 40 lychee varieties in Australia. The varieties planted along the northern coast of Queensland include B3, Gardenia, and Shuidong. B3, Salathiel, and Huaizhi

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are also commonly grown in central and southern Queensland and northern New South Wales.

## 2 Lychee grower situation

Christopher (2002) describes and examines ordinary litchi orchards in a similar way to the farms visited. A person can probably manage adult lychee orchards ranging from 5 to 7 hm<sup>2</sup>, but he needs to hire workers at the harvesting and grading packaging stages, depending on the proportion of different yields. Need to employ 5 to 10 workers during the harvest season. Orchard general facilities include: under-tree sprinkler systems, tractors, sprayers, wheelbarrows or lawn mowers, trailers, harvesters, nylon nets, as well as graded packaging rooms and cold storage. The delegation mainly visited the Tomarata Orchard and the Emperors Choice Lychee Orchard in Queensland.

Mr. John, the farmer of Tomarata Orchard, 58 years old, manages the orchard together with his wife. His son usually helps but needs weekly pay. About 80hm<sup>2</sup> of Tomarata orchards, including forests and ponds, and lychee fruit cover an area of about 9hm<sup>2</sup>, with about 3,000 strains. In addition to litchi, the farmer also cultivates a small amount of stonefruit and raises dozens of cows. Litchi trees are planted according to the regular plant spacing, and iron orchards are raised with large nylon nets to prevent fruit bats and birds from stealing and destroying litchi during the mature season. Crown management uses mechanical trimming, trimming mainly along side bevels and top flats, cutting crowns into trapezoidal shapes, and assisting with manual construction.

The Tomarata orchard entrance has lychee processing equipment, including graded packaging lines and cold storage, and some lychee processing equipment. The entire litchi picking and packing process is relatively simple. Workers pick litchi and put it into the leather baskets of the shoulders, which are then put into plastic baskets. The carts are sent to a pre-cooling room, cooled with cold water, and then transferred to a grading line. The packaging line is directly connected to the cold storage. After the lychee is packaged, it directly enters the cold storage. The next morning, a logistics company will send it to the supermarket for sale.

The high wages of wage earners are an important burden on farmers. The farmer's picking worker's wages are AUD 24 per hour, and the farm's wages paid during the picking season will reach AUD\$10,000, which is a considerable amount of money.

In addition to operating an orchard, the farmers and their wives opened a litchi processing shop selling lychee processed products including lychee salad, litchi, lychee jam and lychee ice cream, of which lychee chili sauce is a better product for their sales, and lychee ice cream is also popular. The product. There are many varieties of lychee processed at the farm, and the price can be sold for AUD 28 per bottle. Visitors can purchase it first. In addition to selling lychee processed products in stores, they also sell lychee processed products to Brisbane and other cities through relevant channels. The farm also sells products through the Internet. Litchi processed products enable them to sell lychee related products throughout the year and own their own brand, Lychee Divine. Due to the need to sell lychee processed products, John and his wife need to spend a lot of energy in litchi processing, product development and market development.

The area of the farm of the Emperors Choice Lychee is approximately 32hm<sup>2</sup>, the planting area of litchi is approximately 18hm<sup>2</sup>, and 2600 lychee trees. The farmer Rick and his wife have been 70 years old, both have retired for more than 10 years and have been operating the orchard for 17 years. Their income does not come from the operation of the farm, but a hobby. The farm has a dedicated parking lot, spray cooling room, graded assembly line, cold storage, and a dedicated place for workers to rest. Rick has served as the head of one of the two litchi market sales organizations in Australia and has a very deep understanding of the litchi market. The farm has its own brand, Emperors Choice Lychee.

The farmer has long hired a young French man to assist in the management of orchards, including spraying pesticides, cutting branches, etc., and hiring workers to harvest, grade and pack during the harvest season. In addition to picking, the fruit farms have basically achieved mechanization, and the orchards are equipped with automatic sprinkler systems. Mechanical trimming is used for fruit tree trimming. Artificial labor for the harvest season requires 23 to 25 people. The source group of the workers is usually the locals or backpackers. The working price is about 22 Australian dollars per hour. During the picking



season, the farmer will work out a detailed work plan and pick it up according to the workload. After lychee picking, simply go to the branches, go to the diseased fruit and small fruit, put the basket into the spray room for pre-cooling, and then enter the grading line for grading. Mr. Rick's farm has more grading staff, the assembly line can be sorted according to the size of the fruit, and can accurately calculate the weight per box is 5kg. The products are mainly divided into three grades: the first product with a circle larger than the standard circle, the price is 35 Australian dollars per box (5kg); the second product is less than the standard circle, and the price is 16 to 20 Australian dollars per box; the appearance is flawless For third-class products, the price is 12 to 16 Australian dollars per box. Each box allows 20 lychees not to meet the standard. There are different packages for different types of markets. The farmer told the inspectors that the income of each tree in 2015 was about 200 Australian dollars. For the purchase of chemical fertilizers, the current purchase was used, and the purchase of fertilizers was not waste. The cost of land, labor, and material inputs was approximately 2 Australian dollars per kilogram.

Farmer Rick has unique insights into the Australian litchi industry. He believes that litchi production is a business. To be able to operate well, it requires a high degree of specialization, adequate financial support, and full control to ensure quality. He believes that, like most commodities, litchi growers are price recipients, not price deciders, and the only way to increase profits is to increase operational efficiency, produce high-quality products, and produce financially viable production. In terms of input, we need to consider the efficiency of the output, such as the prevention and control of pests. In the use of pesticides and artificial inputs, we need to consider whether this investment is worthwhile in the future. If it is uneconomical, we should not invest it.

### 3 Australian Litchi Industry Organization

From the point of view of production technology, Australian producers are learning about China in many aspects, including introducing Chinese varieties, adopting circumcision to control the growth and flowering of litchi, and introducing Chinese litchi processing machinery. However, they are far ahead in the development of industrial organizations. In China. The litchi industrial organization in China began its development in the last five years and mainly focused on the development of farmers' professional cooperatives. The delegation visited the Litchi Growers Association, the litchi sales organization, middlemen, irradiation companies responsible for pest prevention and control of agricultural exports, and export transportation companies.

#### 3.1 Growers Association

The Australian Lychee Growers Association (ALGA) is a voluntary organization and is also an agricultural political organization supported by the Australian Department of Primary Industry. Its main role is to coordinate litchi research, chemical registration, and market standards on behalf of litchi producers. Entry and environmental issues. ALGA's main role is three: First, industrial research and development. The second is to play a role as a lobby group and advise the government on policies. The third is to decide how to use R&D expenses.

ALGA's funding sources include funds that ALGA members are willing to raise for the association. From 2008, the special product tax was paid at the rate of 0.08 Australian dollars per kilogram, or AUD 0.40 per box (5 kg). Those growers who did not join the association must also press About 60% to 70% of litchi growers have joined ALGA with this standard. The special product tax is directly assigned by the seller to the government fiscal account, and then transferred by the government to the ALGA account. Of this amount, about one-third is used for market development, and two-thirds is used for research and development. The government will provide 1:1 support for some funds for research and development. The use of research and development funds needs to be applied by researchers and then used exclusively for research on the litchi industry. According to the 2014/2015 Australian litchi output of 1900 tons, it can be calculated that the special tax for litchi is about 150,000 Australian dollars, including 50,000 Australian dollars for market development, 100,000 Australian dollars for research and development, and government support for 100,000 Australian dollars, altogether about 20 000 Australian dollars for research and development. It can be seen that the development and promotion of Australia's

specific agricultural products depends to a large extent on the size of the industry. The greater the scale of the industry, the greater the government's support for this industry and the better the industry's development. According to an interview with ALGA, since litchi is a very small agricultural product, the government has not put this product in a very important position and the exit of farmers is normal. However, this mechanism is tightly integrated with the market. If a product has market potential, more and more producers will join in, and the government's support will increase. If the market size of products is limited, the government will support it accordingly. There will be less. This can also increase the efficiency of the use of government funds.

Although ALGA is not primarily responsible for litchi sales, it will participate in the development of international markets and provide relevant support for relevant industry standards, such as pest control, pesticide use, and product standards, to solve the problems of the entire industry.

### 3.2 Litchi Sales Organization

Within ALGA, Lychee growers in Queensland formed the United Lychee Marketing Association (ULMA) 18 years ago to sell lychee for non-profit organizations, mainly litchi growers in different parts of Queensland. In order to solve the problem of logistics management, under the ULMA, three regional organizations are established to manage the daily activities of the members of the region: the North Queensland Litchi Sales Association, the Central Queensland Weekly Litchi Sales Association, and the Southeast Queensland Weekly Litchi Sales association. Members are automatically invited to become members of the association through invitations. Members are controlled in quantity to ensure that there is no oversupply, and that reputable growers become members of the association. The expenses of the three regional associations are paid by the members themselves, and a fee of 0.1 Australian dollar is charged as a running fee of the association for each sale of a box of litchi (5kg).

There are two grower representatives in each of the three regions of northern, central and southern Queensland. Each year, regular meetings are held to discuss related issues. ULMA created the Sun Lychee Group for the export market, and exported products using the Sun Lychee export brand. The group has been established for 20 years. Growers can apply for the time unit for the year, and the quality of the product meets the standards, and the right to use the trademark can be obtained. The annual use fee is 0.02 Australian dollar per kilogram, or AUD 0.10 per box. The visit to the Emperors Choice Lychee orchard farmer Rick is the originator. The chairman and secretary are members of the association. His wife Lynne once served as sales association accountant. The association will give them a small amount of compensation, but they generally do not charge it and they are obliged to Association services.

ULMA established a network system where members of the association entered their own information into the system. The Association's main role is to ensure product quality and irradiation agreements, negotiate market agents, product packaging and unified use of Sunlychee, control of the three districts have a suitable number of members. The former chairman of the association, Rick, mentioned four major factors in the successful operation of the association: continuous supply of products, quality assurance, unified brand identity, and a single trading platform (single Desk marketing).

Since the planting of litchi in Queensland spans about 1 200 km from north to south, the entire harvest season lasts 3 to 4 months. The size of the association's members ranges from 10 to 100 tons. Due to the short harvest season, an orchard generally has only 4 weeks. It is difficult for them to sell their products themselves, especially for chain stores and export markets. Through the establishment of ULMA, members have the opportunity to use the association's brand Sun Lychee to promote their litchi. ULMA employs a Marketing Coordinator to promote the lychee of its members. The single trading platform model makes it easy for large buyers to purchase products without having to deal with each producer individually. All ULMA members must strictly implement the association's quality assurance standards and food safety standards. This is the only guarantee for the association that the packaged lychees used in the logo of the association are all of the same high quality guarantees, and all members of the association will receive complete lychee and safety standards.

In addition to ULMA, there is another export brand, Evolution, which has only been established for two years. It has formed market competition with ULMA, but its influence is still relatively limited.

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Date: 2016-03-18 17:51 Author: Source: "World Agriculture" in 2015 on 08 hits:

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3.3 Sales Agent

ULMA chose Mr. Martin as a domestic and foreign market agent. The agents are responsible for the procedures of product quarantine, product transportation, and the communication of domestic and foreign importers prices. For exported products, a 5% commission is charged based on the purchase price. After the sales revenue is deducted from the quarantine procedures, irradiation and epidemic prevention, transportation costs and agency fees, the remaining portion is returned to ULMA; for the domestic market, Mr. Martin charges a commission of 3%. Growers' products are often transported by professional logistics companies. After Mr. Martin determines that they are shipped to the line, they are transported to the appropriate location. Export logistics and transportation are undertaken by C. T Freight. The transportation costs are borne by the members of the association. Mr. Martin, an agent, reflected that since litchi is a small product, the sales volume is small, and the related work procedures cannot be reduced. The workload is large and the profit is low. Mr. Martin is not just a market agent for ULMA. He also represents other clients and manages products other than litchi, including pods, citrus, grapes and various kinds of nucleated fruit.

In general, the channels from producer to consumer of Litchi are as follows: (1) Farmers directly contact domestic market agents such as Sydney, Brisbane, Melbourne, and Perth. These products generally do not meet ULMA export quality. The product. 2Using overseas market agents to achieve ULMA export standard products, the unified use of the trademark is Sun Lychee. Mr. Martin arranges quarantine procedures, freight and communicates with overseas importers. Mr. Martin charges a 5% commission. 3 Use domestic market agents, such as Mr. Martin, to send products to retail stores, such as Coles Supermarket, Woolworths Supermarket, etc. The final market sales price is determined by the final seller, and the association is not responsible for whether the product can be sold eventually.

3.4 Litchi export epidemic prevention and quarantine

Australian native litchi consumer market is mainly concentrated in Asian residents living in Australia, especially those from mainland China and Hong Kong and Macao, as well as Vietnamese and Thai immigrants. Market capacity is very limited. Farmers and associations pay special attention to the development of foreign markets, and export quarantine. Standards are among the most important issues. Due to the short shelf life of litchi, short-term fresh food after picking can ensure the taste and quality. Unlike other agricultural products, the quality of litchi can be greatly damaged by heating, freezing and smoking of sulfur. Australia's current standard for litchi exports is irradiation, which uses radioactive elements for irradiation to achieve the goal of killing major pests and diseases. After the implementation of this standard, products exported to New Zealand all use radiation, and they have been trading for more than seven years and have been very effective. However, the pests and diseases destroyed by irradiation means that consumers are skeptical about product safety, and they will also face the issue of accepting

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standards for product importing countries. Steritech Irradiation Co., Ltd. is the only commercial irradiation company in Queensland. It sterilizes and impairs related import and export agricultural products and medical supplies. Fresh agricultural products have now become a key area for the company's business growth.

Mr. Martin, the market agent, completed a series of document procedures to complete the irradiation quarantine process, including: Mr. Martin, who applied to Steritech Irradiation Company. The information of the application form includes the applicant (Martin), product variety, plantation farm, and needs. Irradiation doses (dose standards based on New Zealand and Australian agreements). 2ULMA Association's shipment record sheet. 3 Quarantine Record (sent to overseas importers with the goods). 4 After the irradiation was completed, Steritech issued a radiation certificate. 5 Production Quarantine Certificate issued by the Australian Government Department of Agriculture, Fisheries and Forestry. The fees paid to the government quarantine inspectors are based on time, and the half-hour fee is AUD 150. 6 Transportation exports by transport companies.

In addition, lychee growers can apply for Freshcare's label, which is a quality assurance program for the Australian agricultural industry. This label indicates the quality of the product is fresh, the environment is protected during the production process, as well as the cleanliness of the planting process and farm infrastructure. Requirements and so on.

#### 4 The Enlightenment of Australian Litchi Industry Development to China

The author through the short-term study of the Australian litchi industry, you can feel the level of development of litchi industry in China and the gap between the litchi industry in Australia, although China's litchi production technology and species improvement to lead in Australia, but the Chinese litchi practitioners can learn from Australia The practices to improve the industrial competitiveness of litchi in China. Comparing the litchi industry in China and Australia, the biggest difference is that litchi producers in China are mainly scattered small-scale farmers. Their capital investment is limited, their production scale is small, and they do not have their own graded storage facilities. Litchi production is only a small part of their income. It was only in the last 10 years that China's large-scale fruit farm began to appear and began to have its own producer associations. However, the role played by the association was still quite limited. Although the size of Australia's litchi industry is limited, the government's support for the litchi industry is very small, but almost all producers are large-scale fruit farms with an average size of around 10hm<sup>2</sup> (approximately 2,500 to 3,000 fruit trees). With good automatic irrigation facilities and own graded packing and refrigeration equipment, they almost all joined their own producer associations, specialized sales organizations, agents, and logistics companies to help them deal with late-stage logistics and sales activities. The division of labor in the industry is clear. Farmers are specialized in lychee production. They understand the litchi production and market conditions. They even have their own brands and can join together to open up the international market. It can be seen that the gap between the litchi industry in China and the litchi industry in Australia is not technically different, and more is the difference in the development of industrial organizations. Overall, there are several points in the Australian litchi industry that are worth learning from China.

(1) To cultivate specialized and large-scale litchi producers. The scale of production is the basis for the professional production of litchi industry. When the scale of production is expanded, producers will invest in automated sprinkler systems, product grading and packaging equipment, cold storage, etc. Only after these post-production processing conditions are available, the litchi sales market Will become mature, products can be graded, high quality and price, consumers will gradually establish product loyalty. However, the development of large-scale fruit farms in China depends on the transfer of land, capital investment, and the settlement of construction land planning issues.

(2) Development of China's Litchi Growers Association and Sales Organization. China's litchi industry has shown that the bumper crop yields and losses in the past few years are due in large part to disorderly expansion in production, centralized listing on sales, and competitive pricing. Lack of cooperation between producers, lack of bargaining power for vendors, and no representative of their own markets. Learning the experience of Australian litchi industry and establishing their own grower associations and sales organizations are the most important means to solve the disorderly competition among producers. The producer



associations can establish brands that can gradually form producers and establish production standards and product quality standards. The formation of production scales will increase the market negotiation power of producers; and the establishment of sales organizations can form market players representing the interests of producers, specifically Producers solve the sales problem and specifically negotiate with other market players such as sellers, agents and transport companies to solve the post-production problems to a large extent.

(3) Establish production practices and product quality standards for litchi producers. Visits from two lychee farms in Australia can be seen on the farm with posted production practices, fruit grading standards, and pest and disease control manuals and medication standards, most of which are provided by producer associations. Litchi production in China lacks a unified standard to guide farmers, and even if it is a large-scale fruit farm, the quality of litchi depends mainly on the subjective judgment of farmers. The modern litchi and longan industrial technology system can formulate corresponding production operation standards and product quality standards for farmers to use in order to provide a basis for future product quality certification.

(4) Pay attention to the standardization and packaging environment of litchi products, reduce litchi transportation weight and transportation costs, and extend the shelf life. All litchi fruit sold in Australia is sorted according to color, size, and variety on the premise of removing fruit and small fruit. The product is pre-cooled before being packaged and immediately entered the cold store after packaging. The box is not iced and transported by a refrigerated truck. This method can achieve fruit quality and price, reduce the size of the packaging box, reduce the transport weight without ice sales, pre-cooling and cold storage links and cold chain transport to extend the shelf life, and ensure the quality of the product during the sale , Reduced losses.

(5) Establish a stable sales agency cooperation mechanism to change the previous “one-hammer” sales model. Even if the sales organization is established, it is still difficult to carry out independent sales activities, and it is necessary to rely on specialized sales agents and importers and exporters. There is a typical “one hammer” sale between the Chinese litchi acquirer and the producer. After the transaction occurs, the benefits are terminated. There is a typical zero-sum game between the two parties. The purchase price of the purchaser is low, and the producer is damaged. If the purchase price of the acquirer is high, the profit of the buyer is impaired and the producer gains profits. Through professional sales agents, the ratio of certain agency fees can create an interest community between the agent and the farmers, and build a producer’s interest spokesperson through sales organizations and sales agents to form a stable cooperation mechanism.

(6) Develop industrial interests through industry associations, promote policy support, and open up new markets. At present, the litchi industry gradually highlights the interests of the industry. Producers often suffer losses, and there is a conflict of interest between production, processing, transportation, and sales, rather than a win-win relationship. Through the establishment of producer associations and sales organizations, various industrial chains can be integrated to form the driving force for internal adjustment of the industry. Through the unified development of international markets and domestic markets, the cost of market development for individual producers can be reduced, and industry standards can be adopted for product development. The quality is controlled to form a stable price mechanism.

(7) There is still much room for the development of litchi processing. A litchi farm in Australia can produce a variety of flavors of litchi wine, lychee sauce and lychee ice cream and other products, and get a considerable profit, which means that the litchi processing industry still has a lot of room for development. Litchi producers in China do not necessarily have to rely on processors. They can develop their own litchi processing industry around litchi production, increase the added value of their products, and make the litchi products available throughout the year, which will have a continuous impact. However, this requires technology. Sustained investment in support and funding, and expertise in marketing.

(8) The international market has great potential to open up. Large quantities of Australian litchi are exported to New Zealand, Hong Kong and other places in China, including the US

market they are developing. This means that although Australian litchi price production costs are so high, there is still a large international market space, and litchi production costs in China are much lower than Australia has far more varieties than Australia, and the quality of some high-quality varieties is also far better than that of Australia. We can vigorously explore the international market. On the one hand, we can increase the profitability of producers, and on the other hand, we can ease the pressure on the domestic market. However, the development of the international market requires the participation of the government and the association in the early stages, and it also requires the producers to organize and produce standard products that meet the requirements of the export, and to cooperate closely with each other in the post-production process.

#### 5 Future Cooperation Areas of Litchi Industries in China and Australia

The most discussed with the Australian Litchi importers and exporters is how to promote the import and export of each other's products. Since Australia and China are located in the northern and southern hemispheres respectively, the production season of litchi is just staggered. This means that the litchi industry in the two countries is not a competition, but the increased consumer awareness of litchi is conducive to the development of each litchi industry. Australian producers are eager to see the Chinese market open to them, especially during Christmas, New Year's Day and China's Lunar New Year to enter the Chinese market and sell good prices. As Chinese people have a relatively deep understanding of litchi, China's litchi market is very large. At the same time, Chinese litchi producers also hope to export lychee to Australia. The price of litchi on the Australian market is much higher than that of the Chinese market, which means huge room for profit. The importers of Litchi who received the interview reflected that they could accept the import of lychee from China at a price of 7 Australian dollars per kilogram. Even if the freight is removed, there is still a large profit margin. However, in addition to the tariff policy, the import and export of agricultural products, the import and export quarantine is the issue that needs to be discussed in depth between the two countries. This is also a hot issue that concerns the Australian litchi experts.

China's litchi was exported to Australia in 2004. Litchi must be sterilized for fruit flies and locusts mainly for low-temperature treatment or hot steam treatment. Both of these methods will greatly affect the taste of litchi. In addition, Chinese lychee exports to Australia are generally transported by ship. It takes a long time and usually arrives only 4 weeks after picking. The quality of products after arriving in Australia is far worse than that of fresh litchi, which has lost its appeal to consumers. The main quarantine standard for the export of litchi of Australia is irradiation. Australia believes that the hot steaming can only kill the fruit on the surface and cannot penetrate into the interior of the product. Smoked sulfur will leave chemical substances on the product, which will affect consumer health. If China and Australia can accept each other's irradiation standards, they can use air transportation to achieve product import and export without affecting the quality of litchi fruit, but this requires further negotiations and technical consultations.

Judging from the feelings of Australian importers of Litchi in China, the quality of Chinese litchi is the best. Fresh litchi should have a large market. The varieties that are more popular in Australia include dumplings, cinnamon, glutinous rice, and sugar in Processed products, litchi juice more popular. If the above trade barriers are resolved, the Australian market is willing to pay a price of about 7-8 Australian dollars per kilogram. It can be seen that strengthening negotiations on animal and plant quarantine matters is the focus of Sino-Australian litchi import and export negotiations. If it can be resolved, it will be a win-win situation.

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