



**Pistachio Growers' Association**



# Chill

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PGA Seminar

September 2014

# Chill

- **Winter chill is critical to ensuring even, synchronized, flowering.**
- **Pistachios have a relatively high chill requirement. Much higher than crops such as almonds, grapes etc**

# Lack of Chill

13<sup>th</sup> November



# Chill

- The main Australian growing areas are marginal to meet the chill requirements of pistachios.
- Renmark has had insufficient chill in 6 out of the 15 seasons of data
- Mildura/Swan Hill has had insufficient chill 4 out of the 15 seasons of data
- Lack of chill can be mitigated

# Measuring Chill

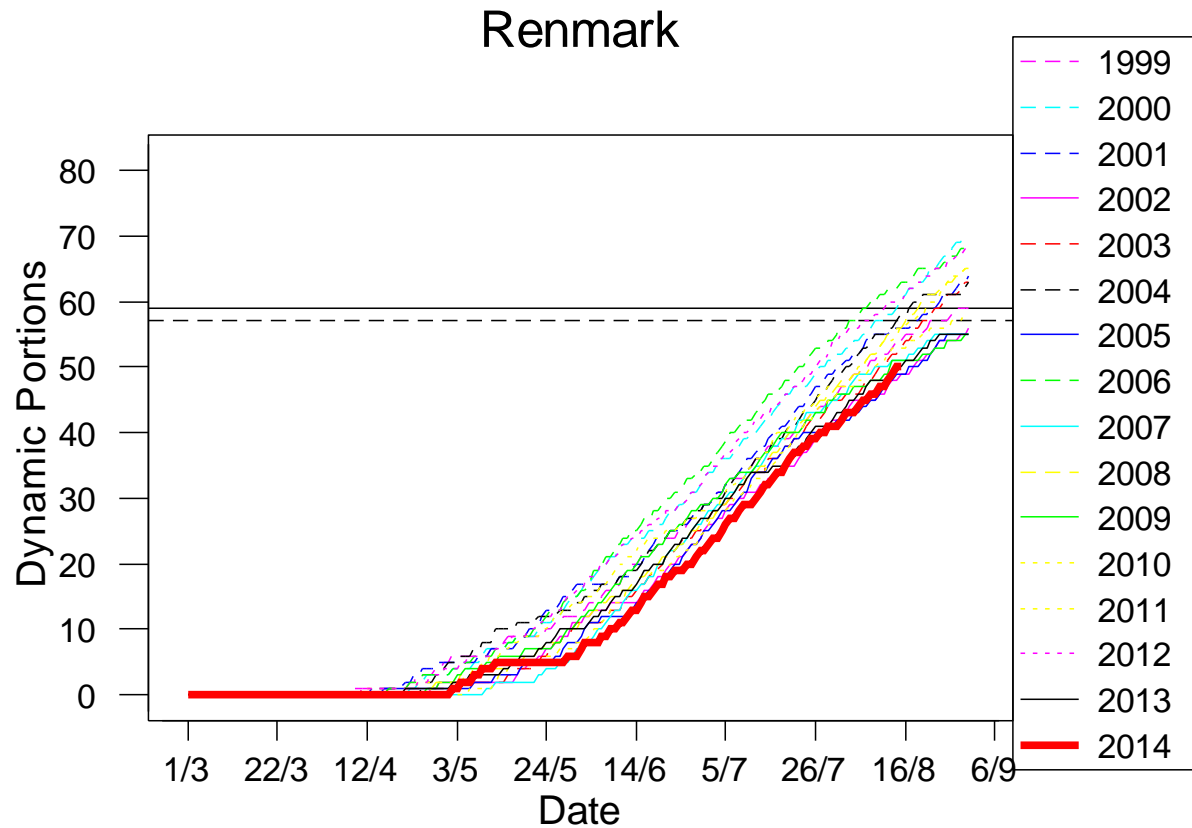
- Traditional methods only use hours below 7.2°C
- These ignore or insufficiently compensate for warm day temperatures
- The Dynamic Model for chill measurement considers the previous temperature and warm day temperatures.
- Australian research by Zhang & Taylor determined the chill requirement for *Sirora*

# Reporting Chill to Growers

- The Dynamic Model is very complex mathematics.
- The PGA subscribes to hourly temperature data from BOM
- PGA calculates the chill monthly from March through to August
- PGA reports to Contributors monthly June through August.

# Report for Renmark

## 15<sup>th</sup> August 2014

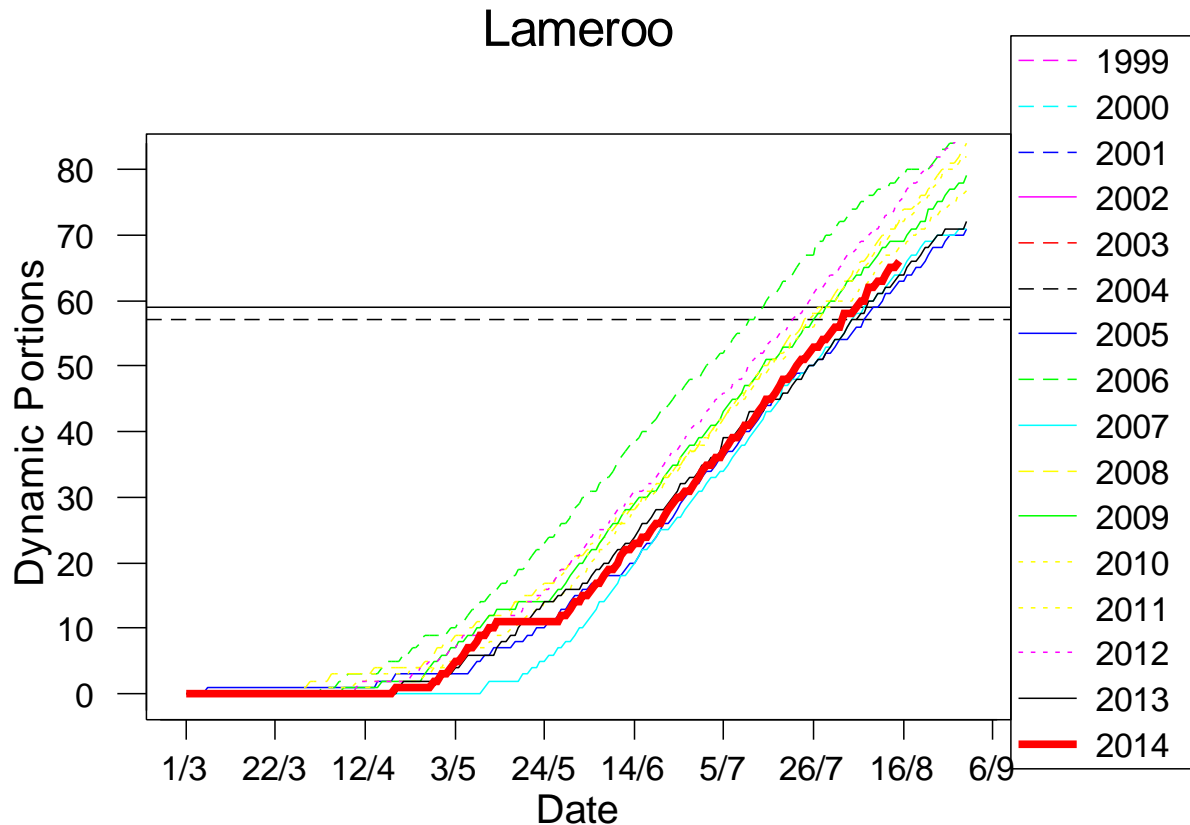


PGA research shows that 59 Dynamic Portions between 1st March and 31st August is sufficient chill. 57 Dynamic Portions to 15th August will in 95% of years produce 59 Portions by 31st August.



# Report for Lameroo

## 15<sup>th</sup> August 2014



PGA research shows that 59 Dynamic Portions between 1st March and 31st August is sufficient chill. 57 Dynamic Portions to 15th August will in 95% of years produce 59 Portions by 31st August.

# Mitigating the effect of insufficient chill

- Australian and Californian research shows that spraying with winter oil in late August can significantly mitigate the impact of lack of chill
- Complete coverage of every part of the tree critical. Slow tractor speed <3kph critical.
- Regular application of oil over many seasons shows no damage
- Details of concentrations and application rates recommended to contributors by PGA

# The Oil Difference

Oiled and unoiled, 13<sup>th</sup> November 2013, Same orchard, trees 15 metres apart



# The Oil Difference

## 2013/14 Season

- Chill in 2013/14 insufficient in many areas.
- By 15<sup>th</sup> August Swan Hill to Renmark had received only a little over 50 Dynamic Units against a requirement of 57.

# The Oil Difference

## 2013/14 Season

### Unoiled trees

- 2/3rds of fruit buds did not open
- 2/3rds of vegetative shoots did not shoot until Nov, Dec, Jan and then did not carry fruit buds reducing the 2015 crop potential

# The Oil Difference

## 2013/14 Season

### Oiled trees

- generally performed well especially with well applied oil
- Many had record off-crop
- Most have good fruit bud set for 2014/15 season

# Thank You

- Dr Jianlu Zhang & Cathy Taylor for the Australian research establishing the appropriate chill model and determining the chill requirements of *Sirora*
- Steve Sykes for the early observation that oil could mitigate the lack of chill and the resultant uneven flowering
- Californian research over a decade showing oil works and is safe
- Horticulture Australia for providing some of the finance for the Australian research
- Australian pistachio growers for providing the majority of the finance for the Australian research