



Economic Development,  
Jobs, Transport  
and Resources

# Picking fruit for optimal flavour and storage

Harvest maturity impacts on fruit aroma  
during storage and marketing

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# Stonefruit Maturity, Quality & Composition

Research to optimize fruit quality for domestic and export market



**Problem**

High variability fruit quality at harvest : Consumer dissatisfaction

- Maturity at harvest affects shelf life and storage period
- Cold storage affects fruit quality and composition



**Approach**

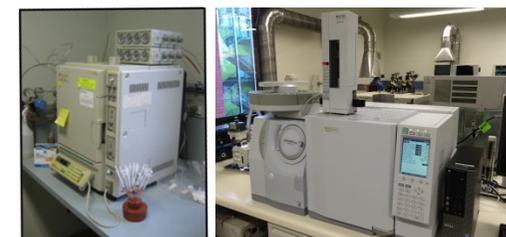
Use the Stonefruit Field Laboratory at Tatura to determine harvest maturity classes to optimise fruit quality and composition during field ripening and after cold storage



Ethylene for maturity classes and VOCs collection based on I<sub>AD</sub> during fruit development



Fruit quality and VOCs as affected by cold storage and shelf life



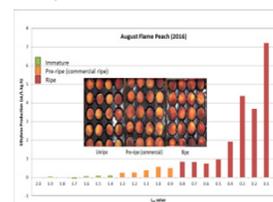
Biochemical analysis by GC and GC-MS

**Stonefruit growers with knowledge to manage fruit quality:**

- ✓ Optimal harvest maturity for consumer preference
- ✓ Maturity class database for grower decision making
- ✓ Optimize cold storage and ripening protocols



Ethylene protocol adopted



**integrity**  
**FRUIT**

Maturity classes adoption

- ⇒ **Deliver high quality fruit to domestic and export markets**
- ⇒ **Improve marketability and increase profitability**

# Stonefruit Maturity, Quality & Composition

Funding and support



**Profitable Stonefruit Systems**

Investigating management options to increase fruit quality and yield of peach, nectarine, plum and apricot

5 Rootstocks X 3 Crop Loads: Low, Medium, High

	Rootstocks					
	Nemaguard	Ebeba	Kyrisk 1	Kyrisk 86	Cadaman	Corrostone
<b>Experiment 1:</b> Peach cv September Sun	✓	✓	X	✓	✓	✓
<b>Experiment 2:</b> Nectarine cv Rose Bright	✓	✓	✓	✓	X	✓

3 Canopy Types X 3 Crop Loads: Low, Medium, High

<b>Experiment 3</b>	Centre Leader	Peach cv August Flame
<b>Experiment 4</b>	Tatura Trellis	Peach cv August Flame
<b>Experiment 5</b>	Centre Leader	Nectarine cv Autumn Bright
<b>Experiment 6</b>	Tatura Trellis	Nectarine cv Autumn Bright
<b>Experiment 7</b>	Vase	Apricot cv Golden May
<b>Experiment 8</b>	Tatura Trellis	Apricot cv Golden May
<b>Experiment 9</b>	Vase	Plum cv Angelino
<b>Experiment 10</b>	Tatura Trellis	Plum cv Angelino

4 Irrigation Levels X 3 Irrigation Timings

<b>Experiment 11</b>	Open Tatura	Nectarine cv September Bright
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**Hort Innovation**  
Strategic levy investment

**SUMMERFRUIT FUND**

**RMIT UNIVERSITY**

**AGRICULTURE VICTORIA**

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# Background

## Aromatic Volatile Organic Compounds

Consumer perception of poor quality fruit because doesn't smell peachy/fruity

### Why?

### What factors may affect fruit aroma?



Maturity stage at harvest  
Shelf life  
Cold storage



From previous research:

Identified 9 key aroma compounds reported for whole fruit aroma

More than 90% of previous work has been done on bulked samples.

Individual fruit;  $I_{AD}$  as maturity index;

# Maturity stage at harvest

Fruit were picked and checked for  $I_{AD}$  using a DA meter  
(most immature on left, more mature on right)



Profiling or ethylene and volatiles:

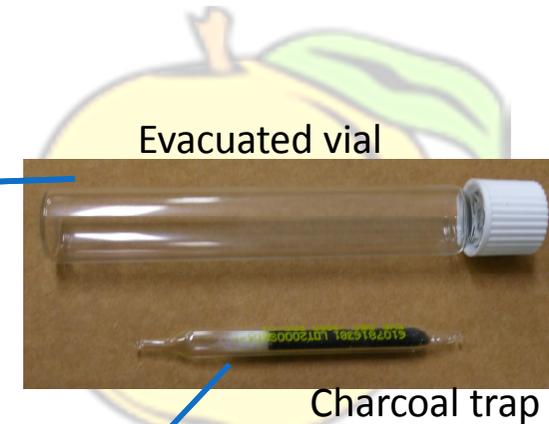
Fruit were harvested across several days for each cultivar.

All fruit used were also evaluated for flesh firmness and soluble solid concentration.

## 'September Bright' nectarine (2016-17)



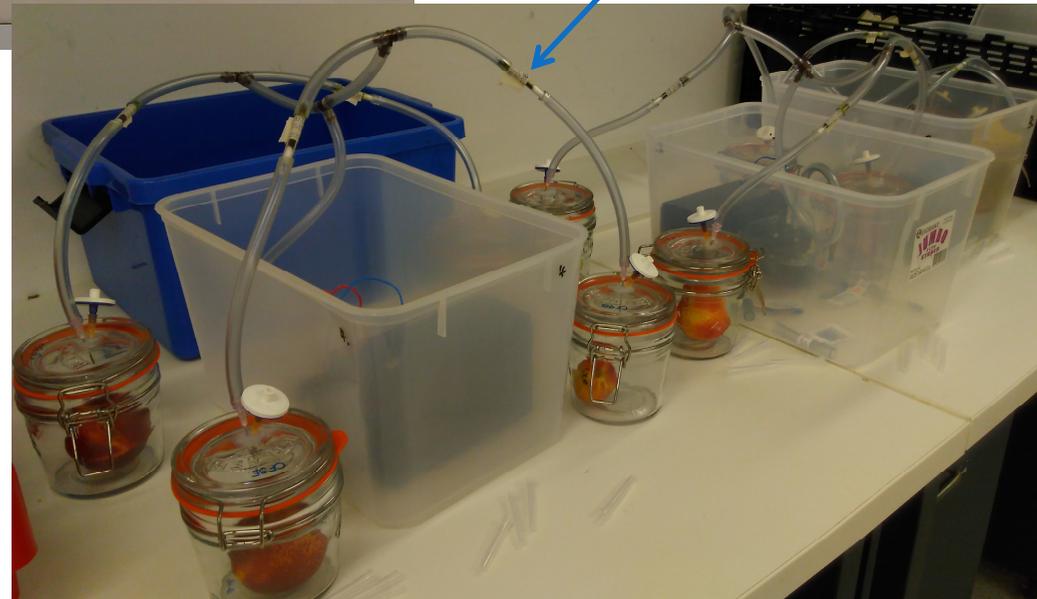
# Maturity stage at harvest



Ethylene and aromatic volatile sampling of individual fruit.

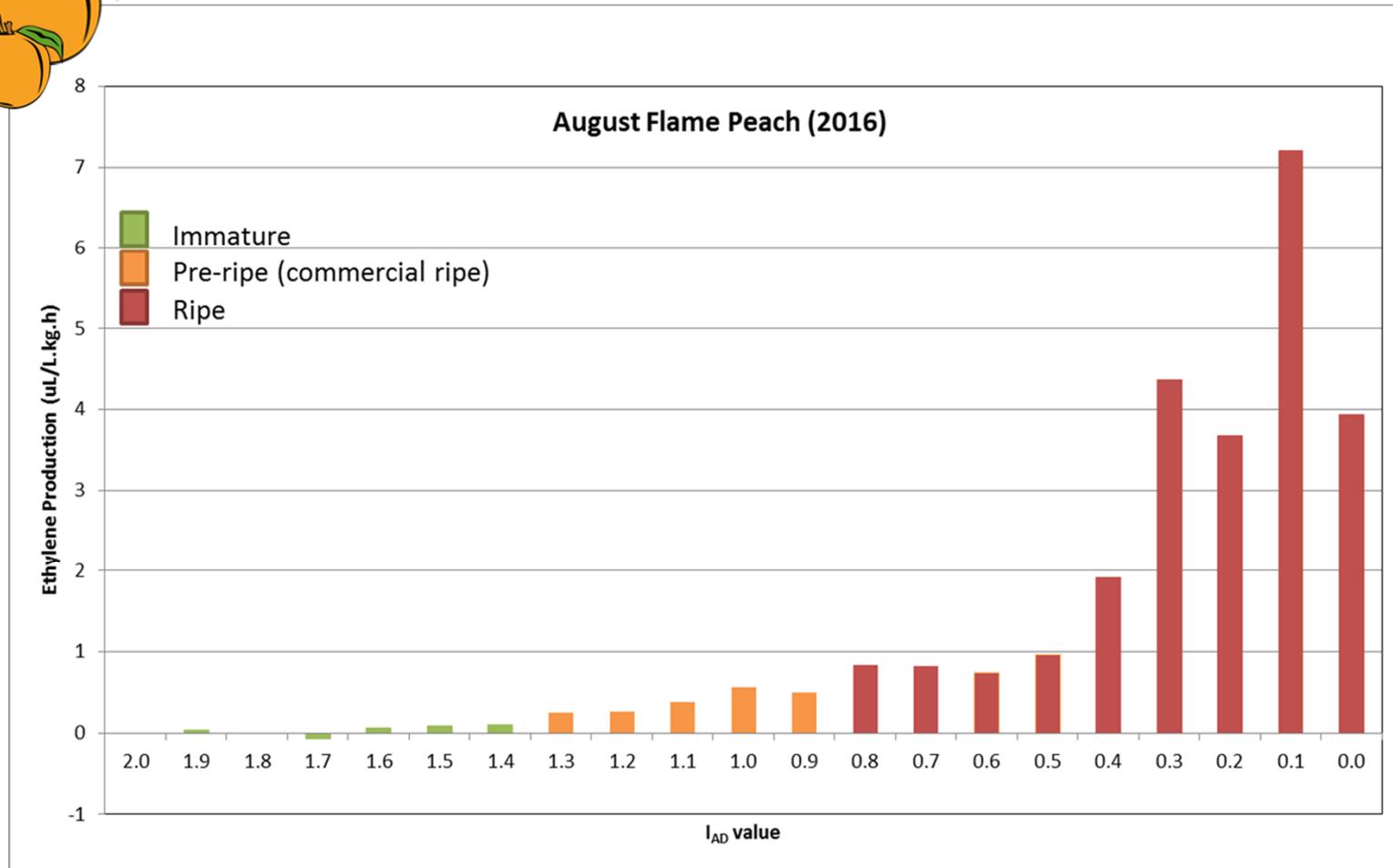
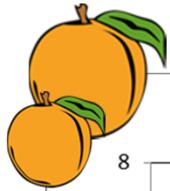
Evacuated vials were used to collect ethylene samples for later measurement by GC.

Charcoal traps were used to collect aromatic volatile samples for later measurement by GC-MS.



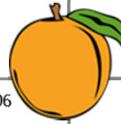
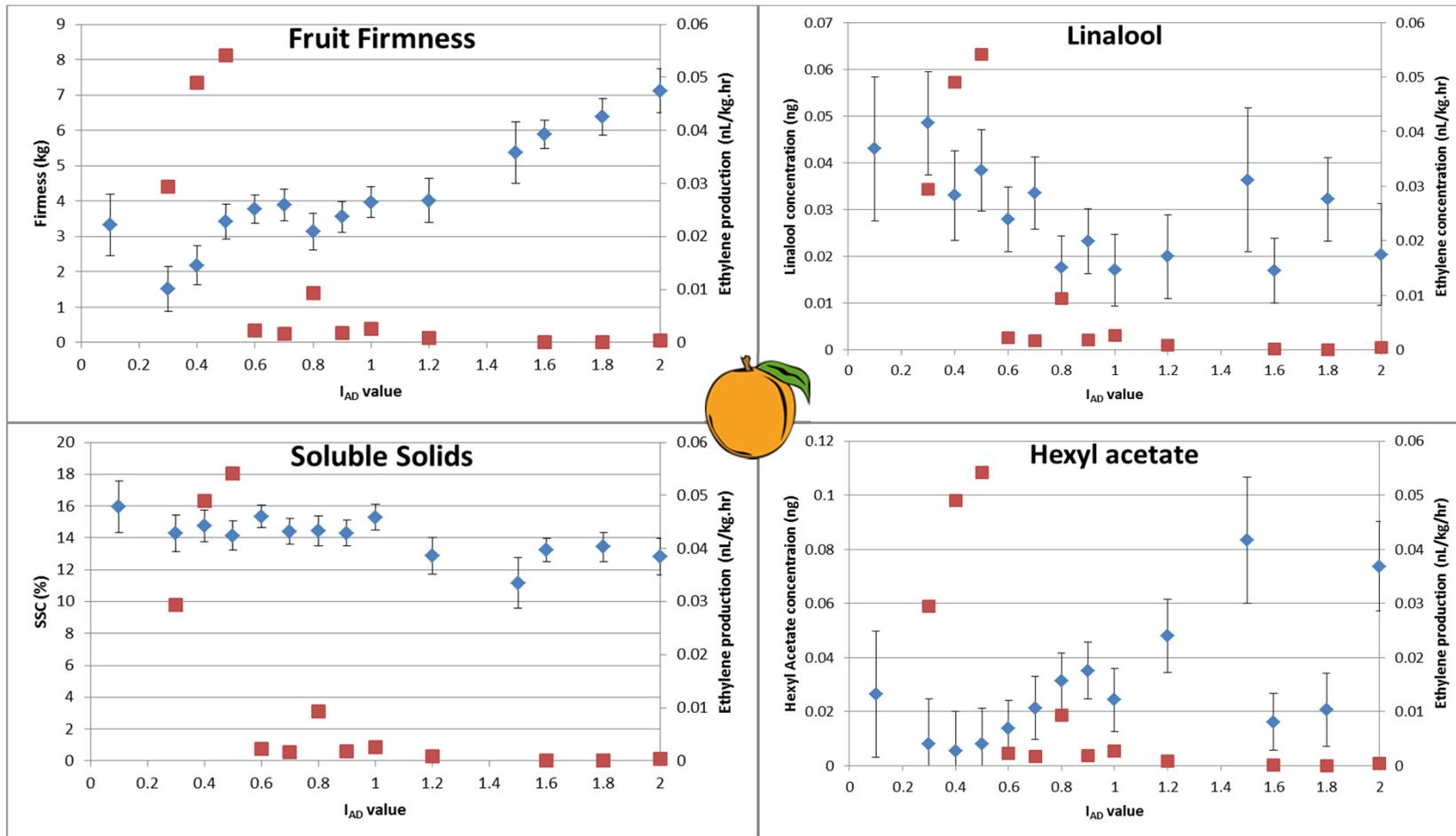
# Maturity stage at harvest

'August Flame' peach (2015-16)



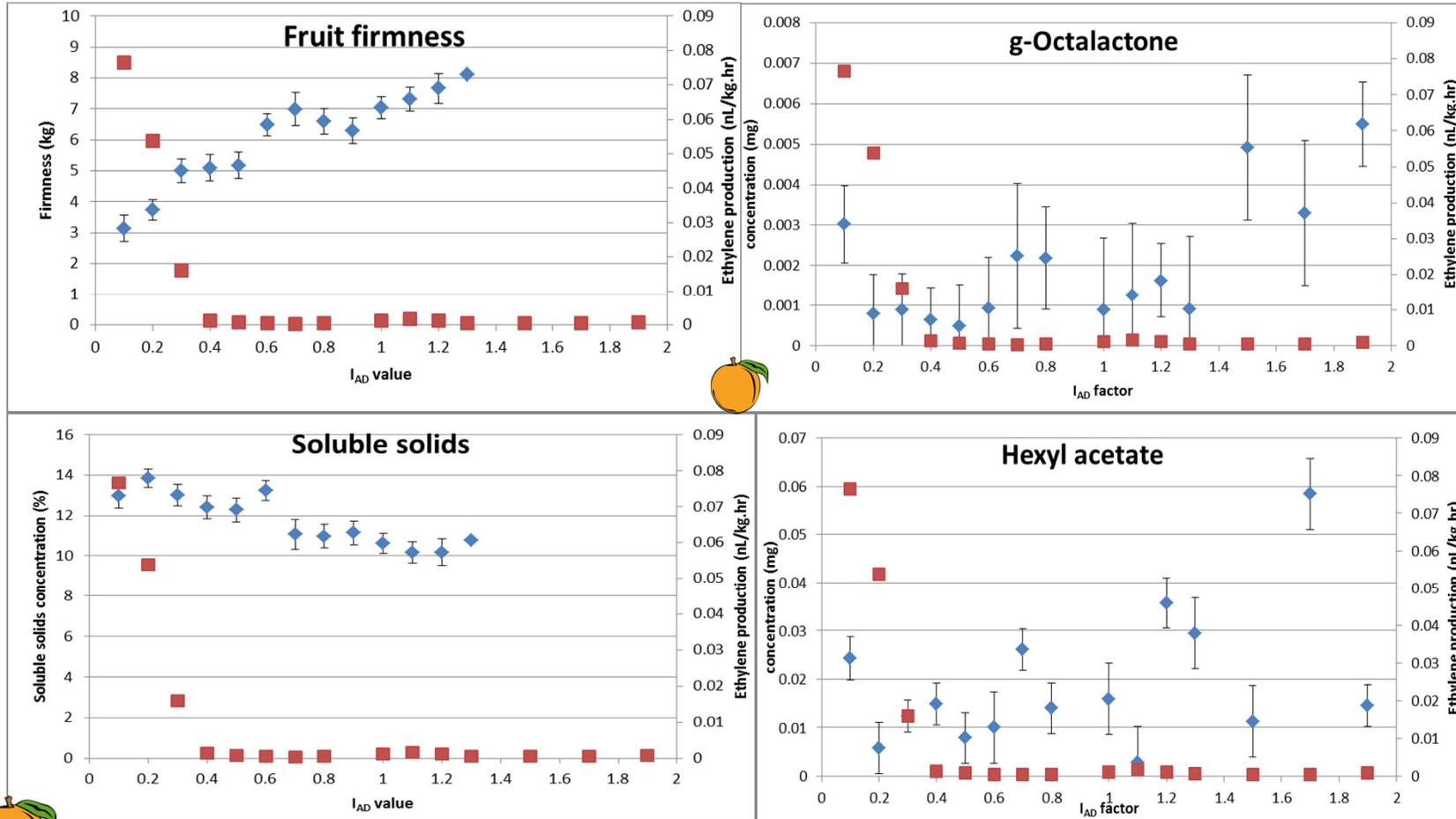
# Maturity stage at harvest

## 'Snow Flame 23' peach (2016-17)



# Maturity stage at harvest

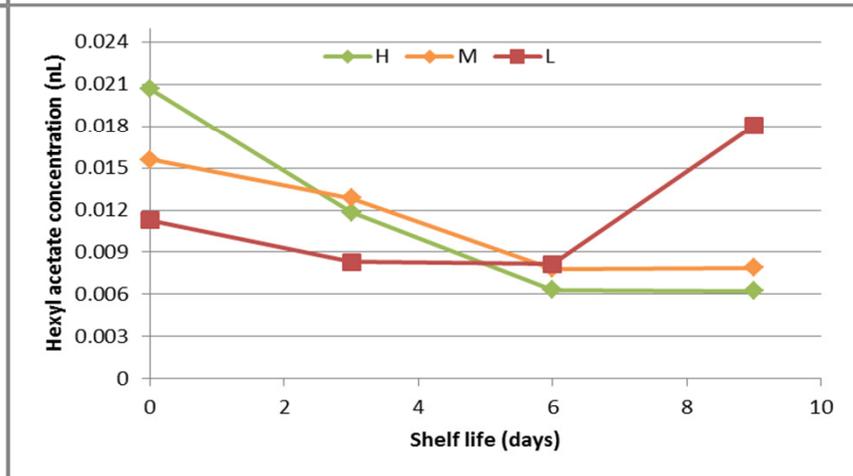
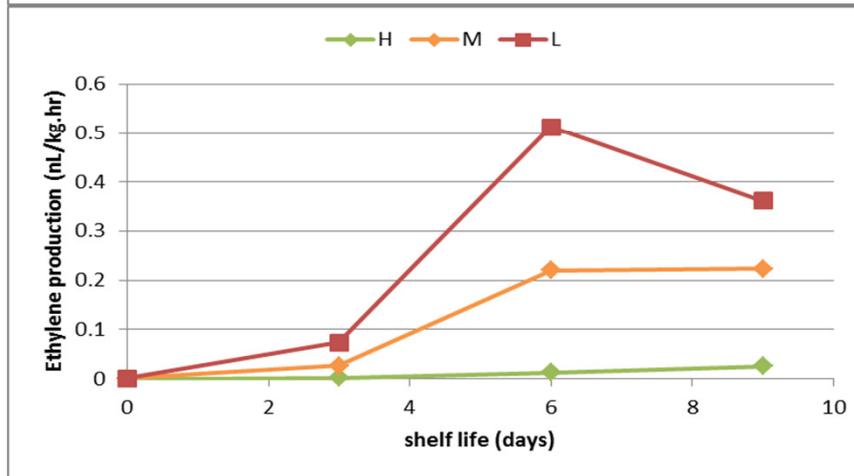
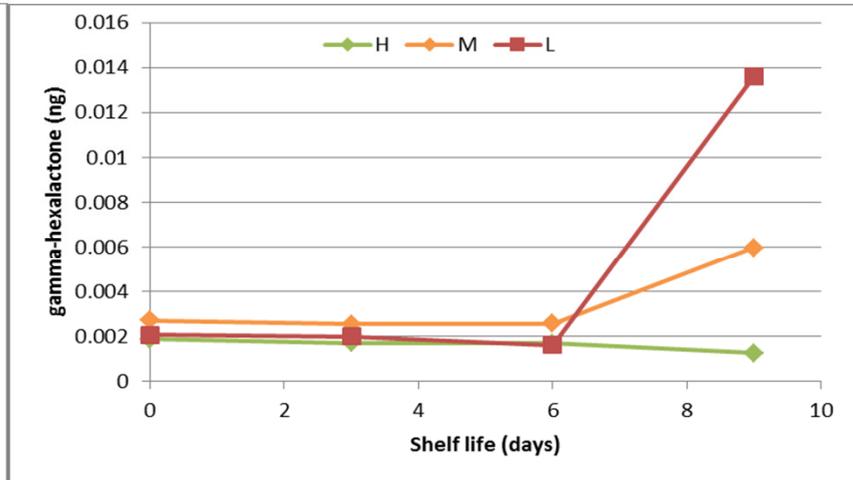
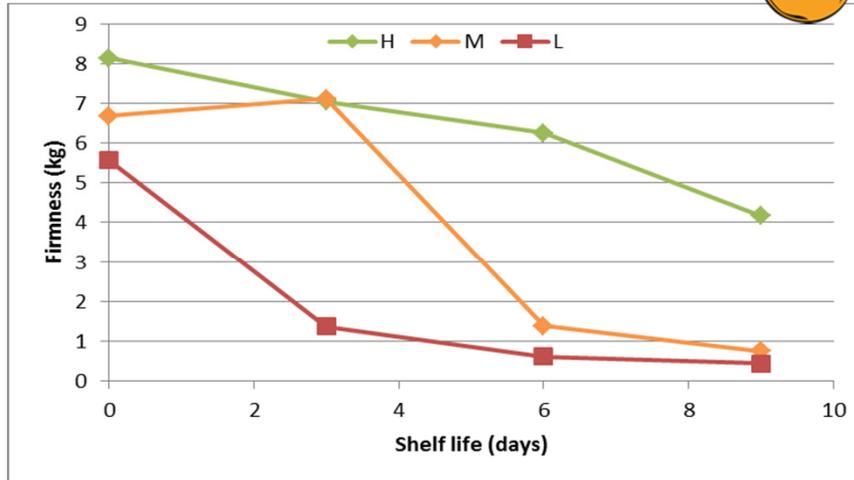
## 'Rose Bright' nectarine (2016-17)



# Shelf life



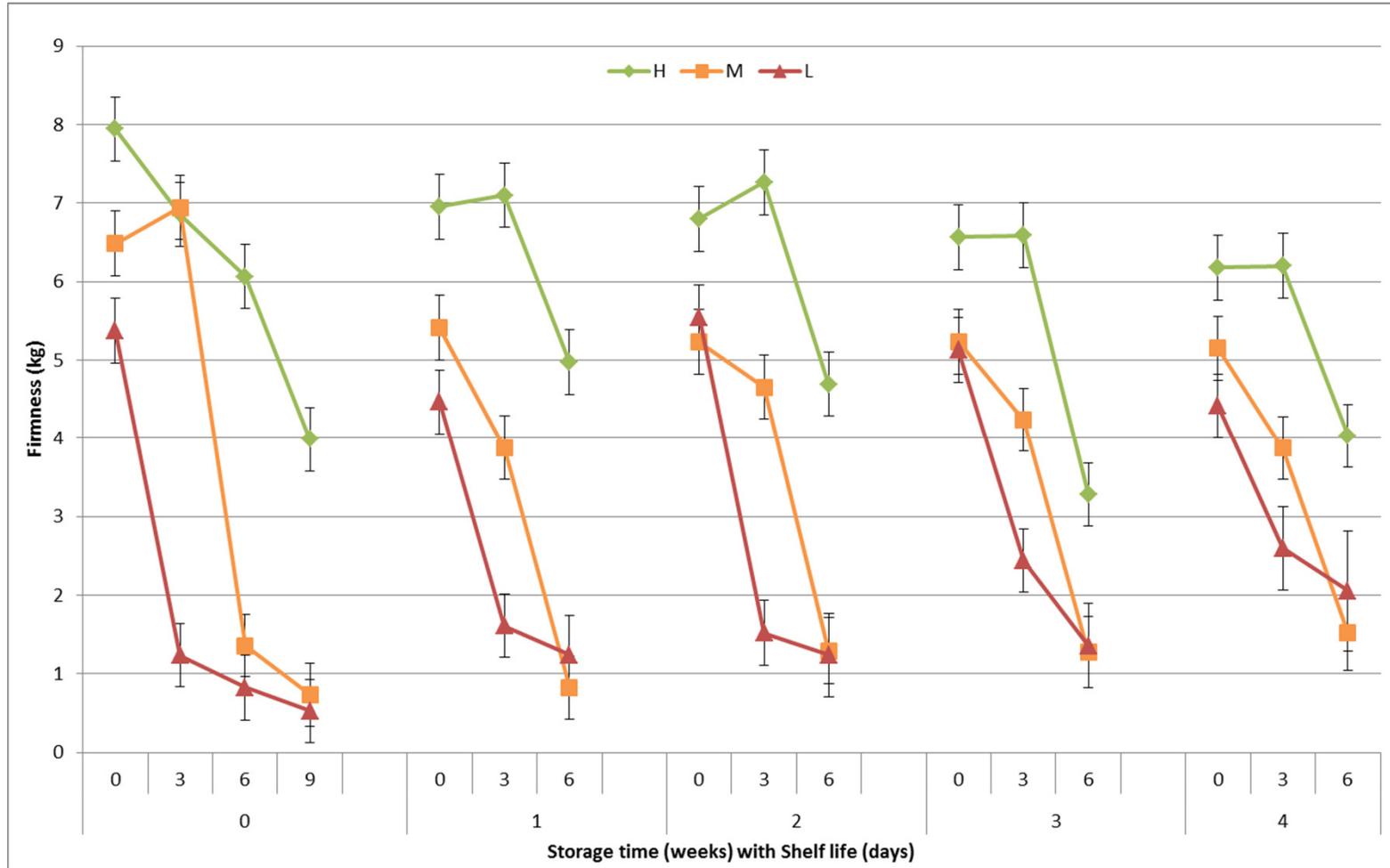
'Rose Bright' nectarine (2016-17)



# Cold storage

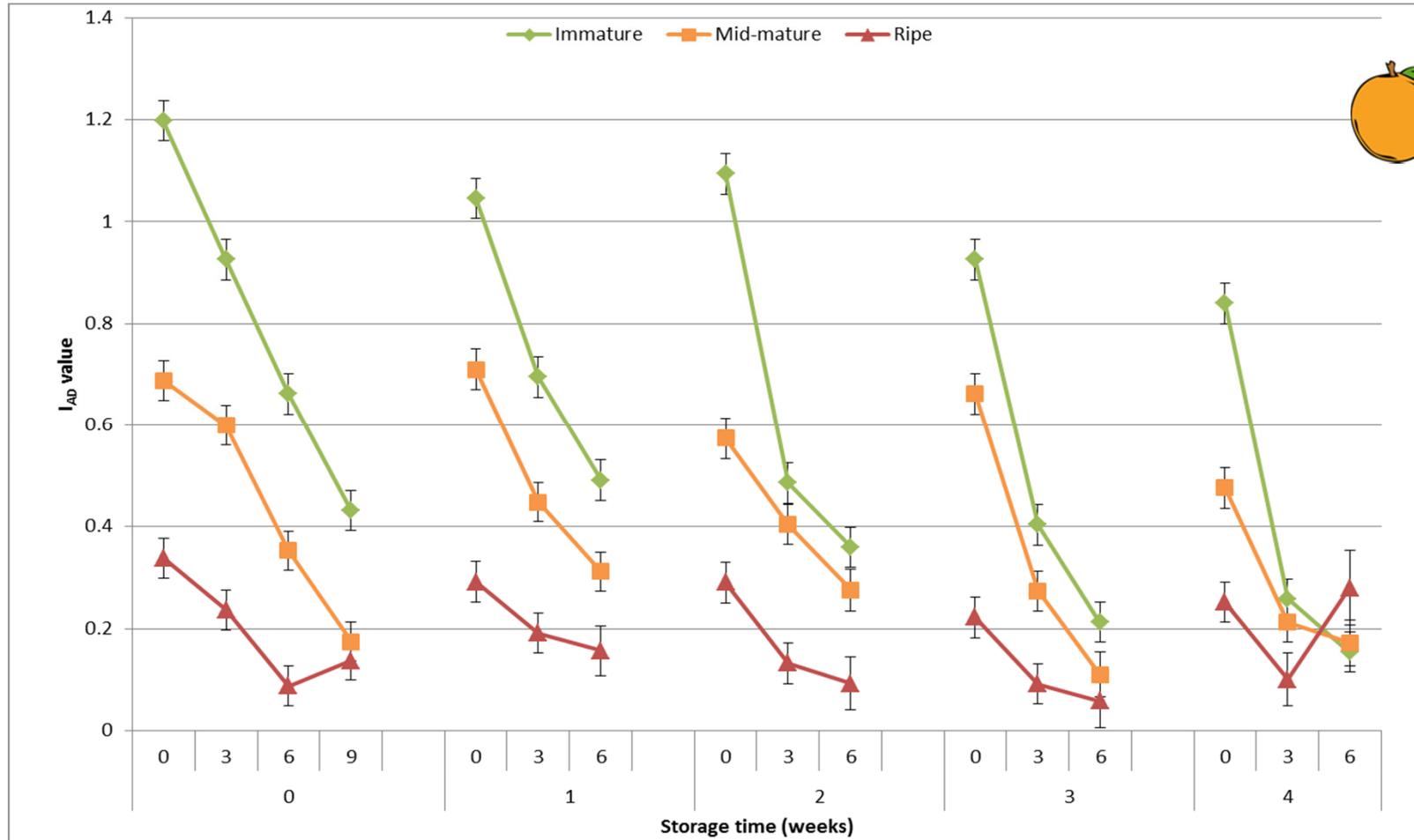


## 'Rose Bright' nectarine (2016-17)



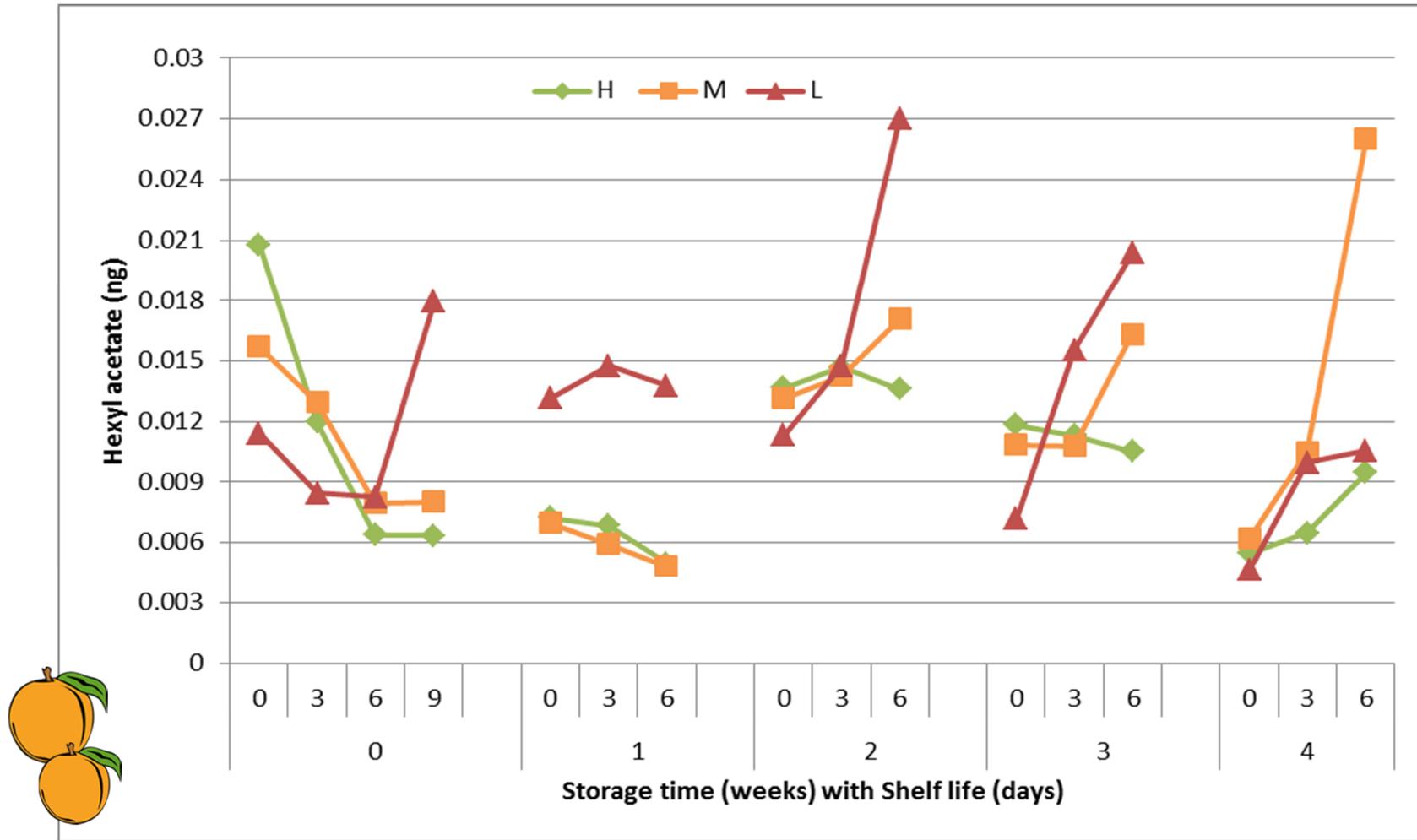
# Cold storage

'Rose Bright' nectarine (2016-17)



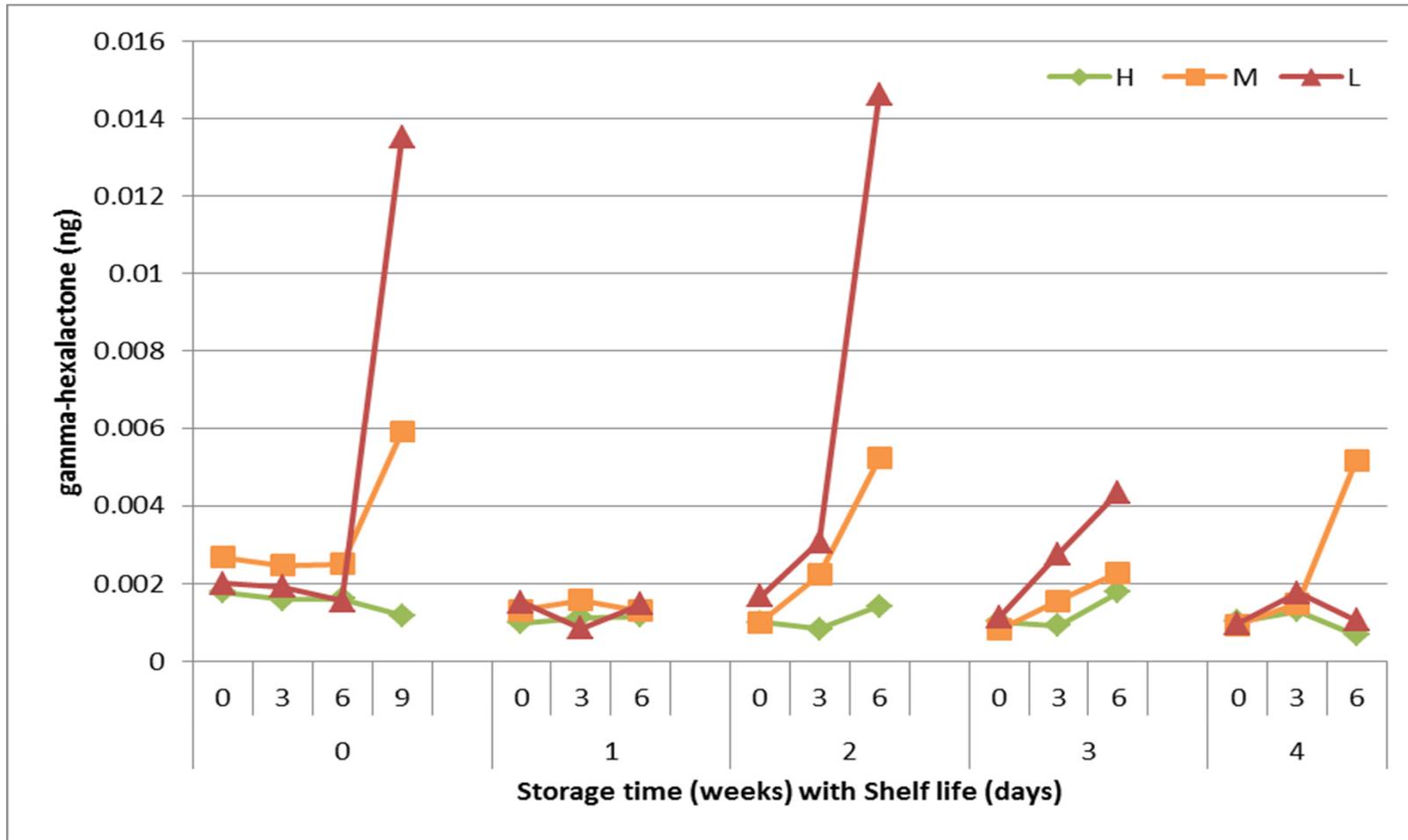
# Cold storage

'Rose Bright' nectarine (2016-17)



# Cold storage

'Rose Bright' nectarine (2016-17)



## What we think so far

Fruit physiological maturity can be determined by ethylene production and is important at harvest:

- For fruit to develop adequate peachy aroma perceived acceptable in the market place there must be ethylene production
- No ethylene means greater presence of unpleasant aroma compounds
- After cold storage and return to ambient temp some of the pleasant peachy aroma compounds show increased production
- Previous work shows difference between nectarines and peaches, and some cultivars within these, showing not all cultivars behave the same with regard to aroma development.

## This coming season:

Continue sampling aromatic volatiles from individual cultivars during fruit development

Confirm: 'Snow Flame 23' peach;  
'August Flame' peach;  
'September Bright' nectarine

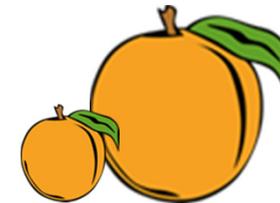
Collect: 'Snow Flame 25' peach;  
'August Bright' nectarine;  
'Snow Fall' peach;  
'Ice Princess' peach

Conduct more Shelf Life trials:

Rose Bright nectarine  
Snow Flame 23 peach  
Snow Flame 25 peach  
August Bright nectarine  
August Flame peach

Conduct Storage Trial:

'August Flame' peach



# What's next?

## Can we further improve market acceptance?

Not all cultivars behave the same.

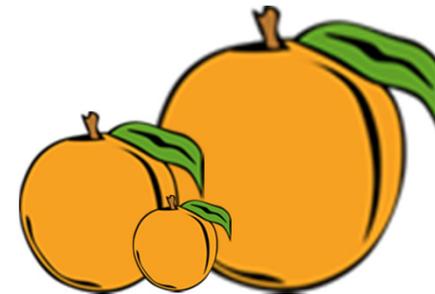
Cultivar selection for your intended market may be important as does harvest time within the season - early, mid, late.

Other factors that can impact on fruit quality including aroma

Chilling injury – is there an aroma compound that can be targeted to identify this

Electronic nose training

Disinfestation



# Questions ?

How many  did you see?!

# Thank you

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