

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



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Ethylene for maturity classes and VOCs collection based on I_{AD} during fruit development

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

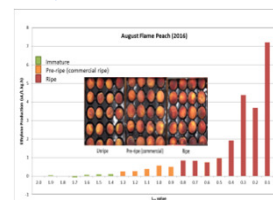
Biochemical analysis by GC and GC-MS

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

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	Eberle	Kyrisk 1	Kyrisk 66	Cadamen	Coronetone
Experiment 1: Peach cv September Sun	✓	✓	X	✓	✓	✓
Experiment 2: Nectarine cv Rose Bright	✓	✓	✓	✓	X	✓

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

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



4 Irrigation Levels X 3 Irrigation Timings

Experiment 11	Open Tatura	Nectarine cv September Bright
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**Hort
Innovation**
Strategic levy investment

**SUMMERFRUIT
FUND**

RMIT
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AGRICULTURE VICTORIA

Economic Development,
Jobs, Transport
and Resources

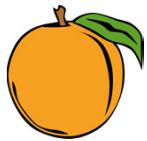
Background

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 of ethylene and volatiles:

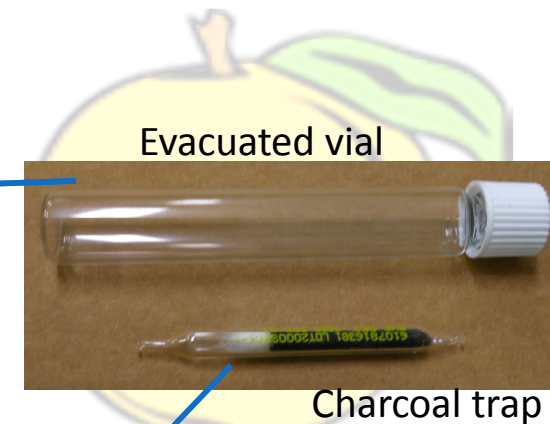
Fruit were harvested across several days for each cultivar.

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

'September Bright' nectarine (2016-17)



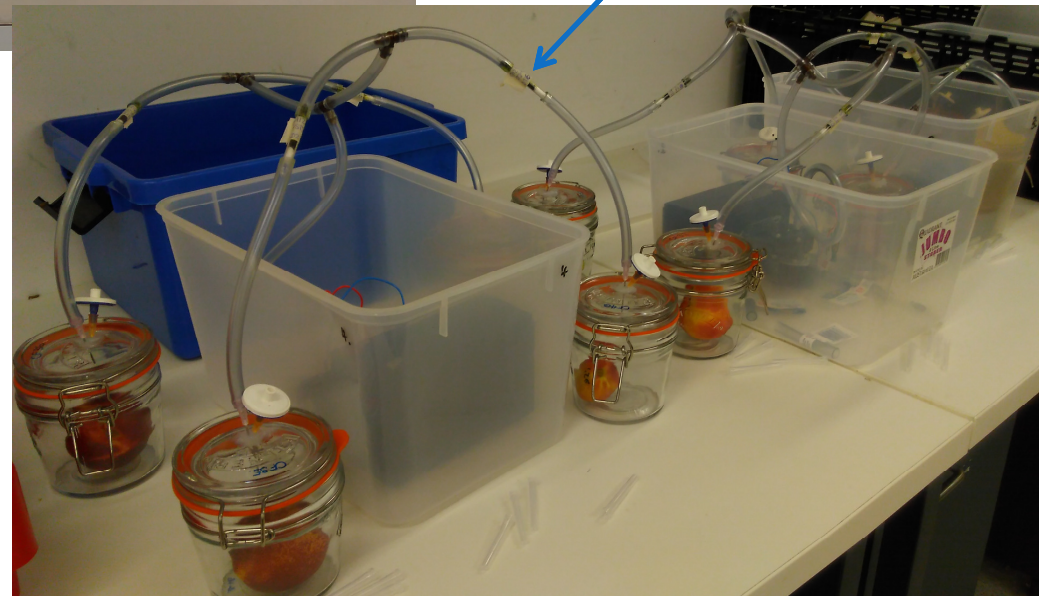
Maturity stage at harvest



Ethylene and aromatic volatile sampling of individual fruit.

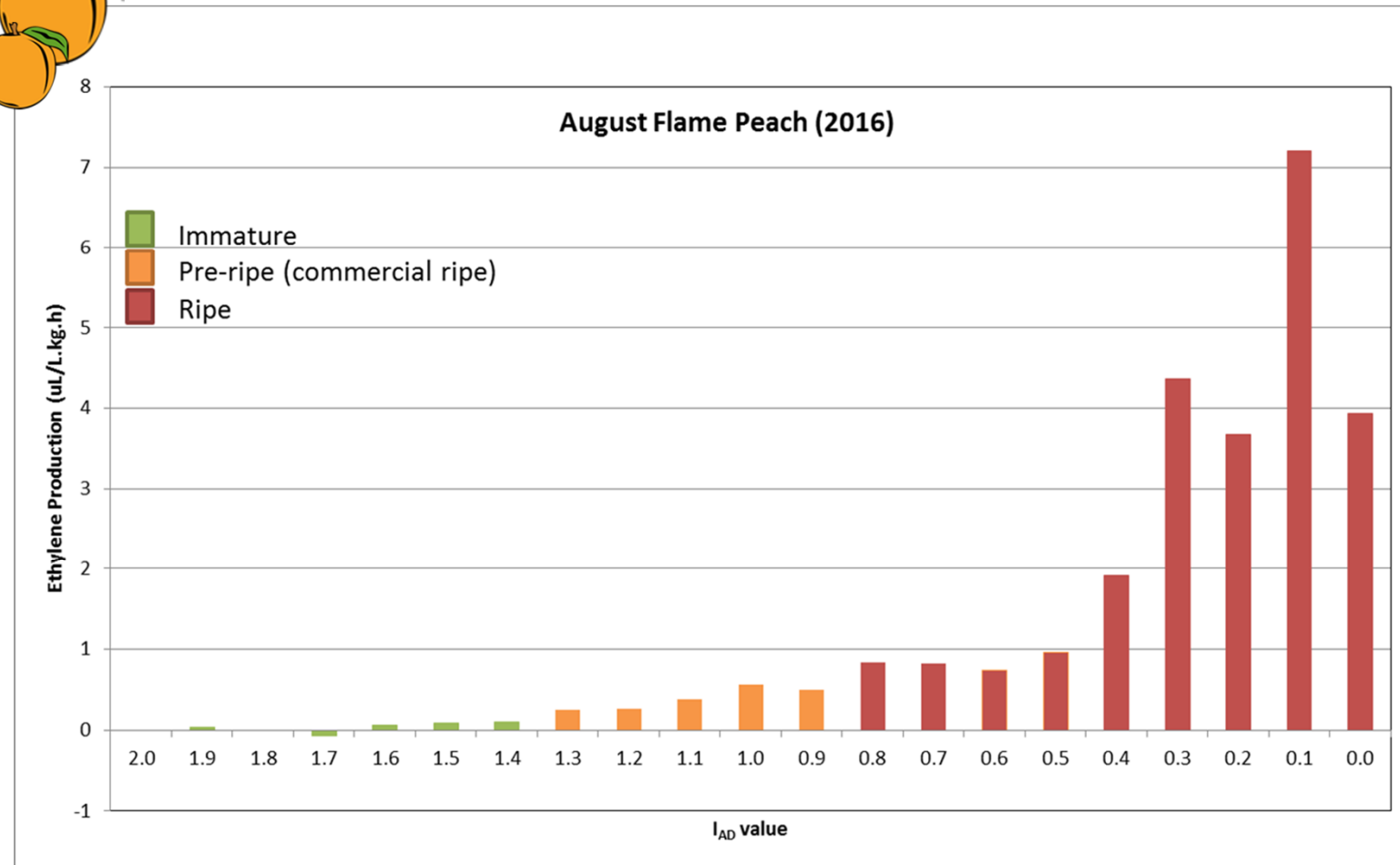
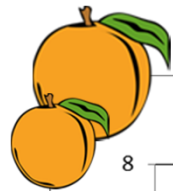
Evacuated vials were used to collect ethylene samples for later measurement by GC.

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



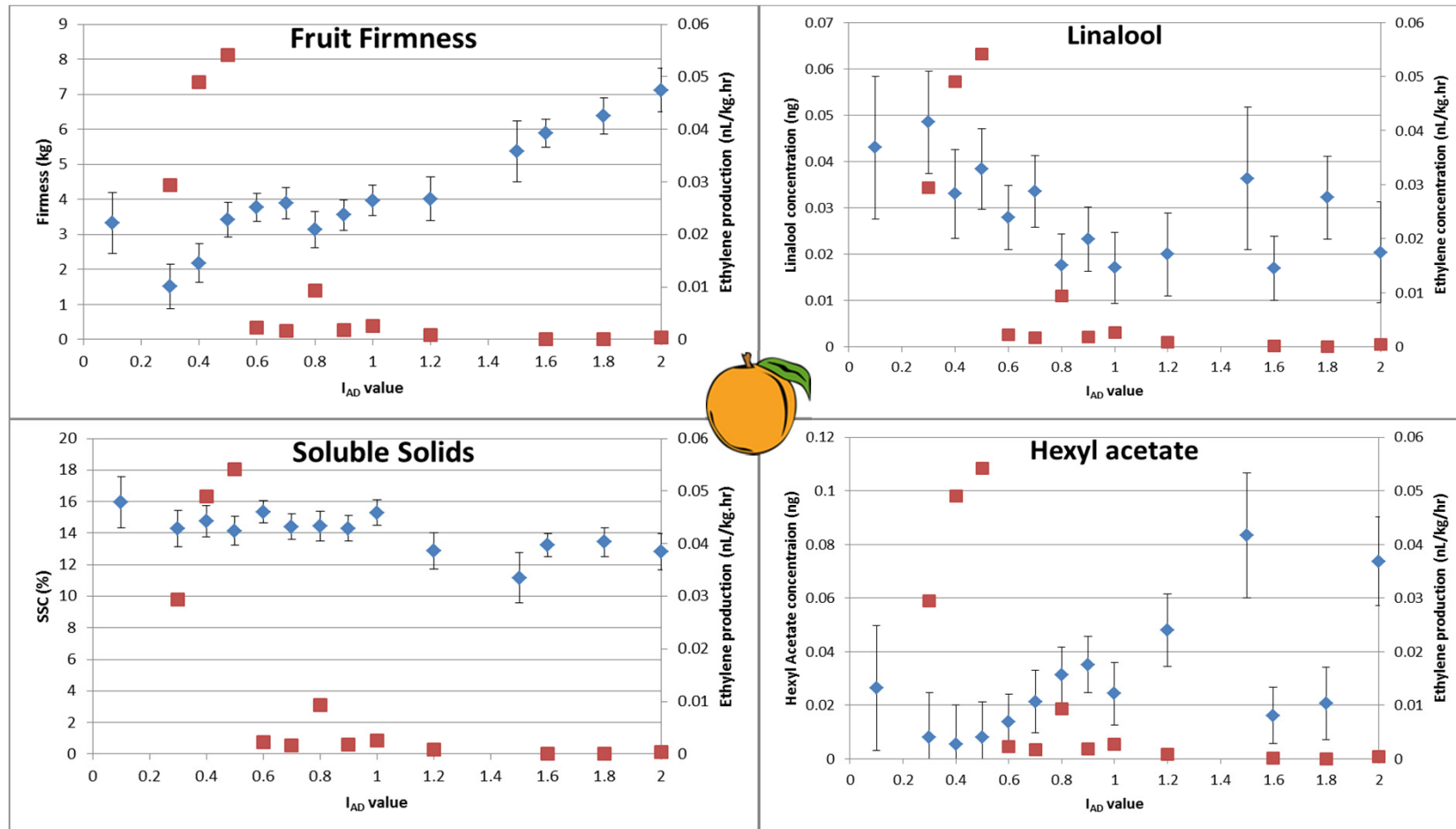
Maturity stage at harvest

'August Flame' peach (2015-16)



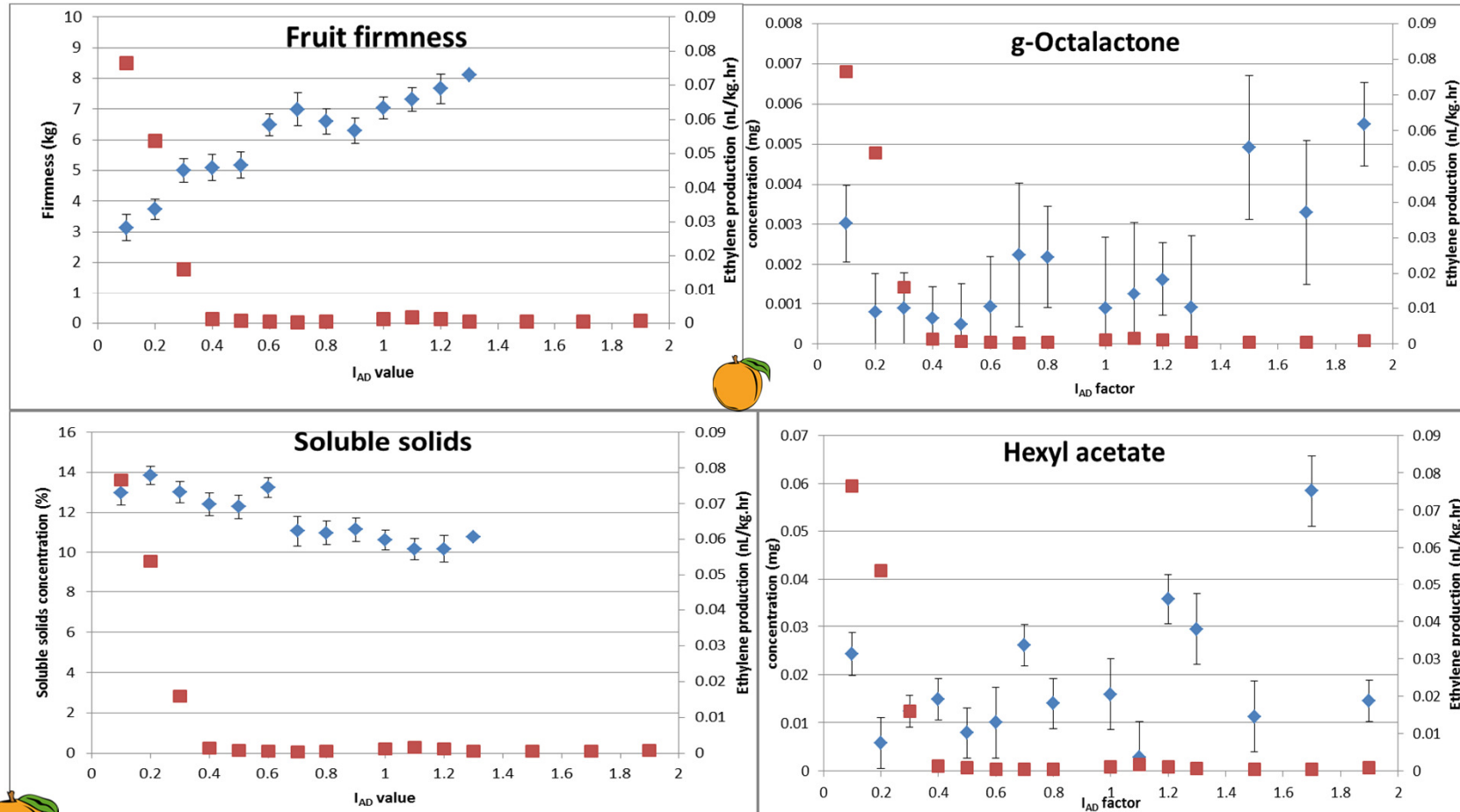
Maturity stage at harvest

'Snow Flame 23' peach (2016-17)



Maturity stage at harvest

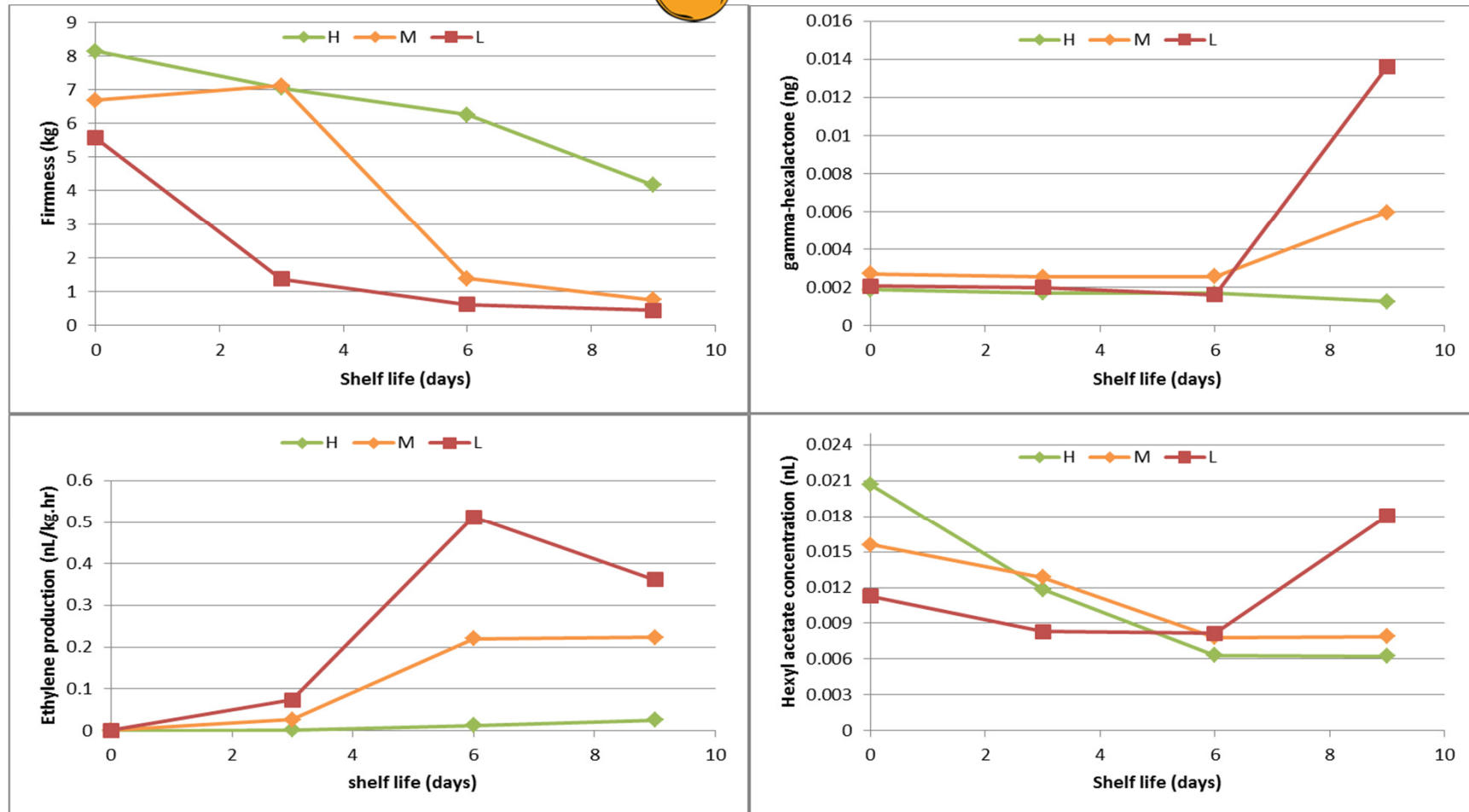
'Rose Bright' nectarine (2016-17)



Shelf life



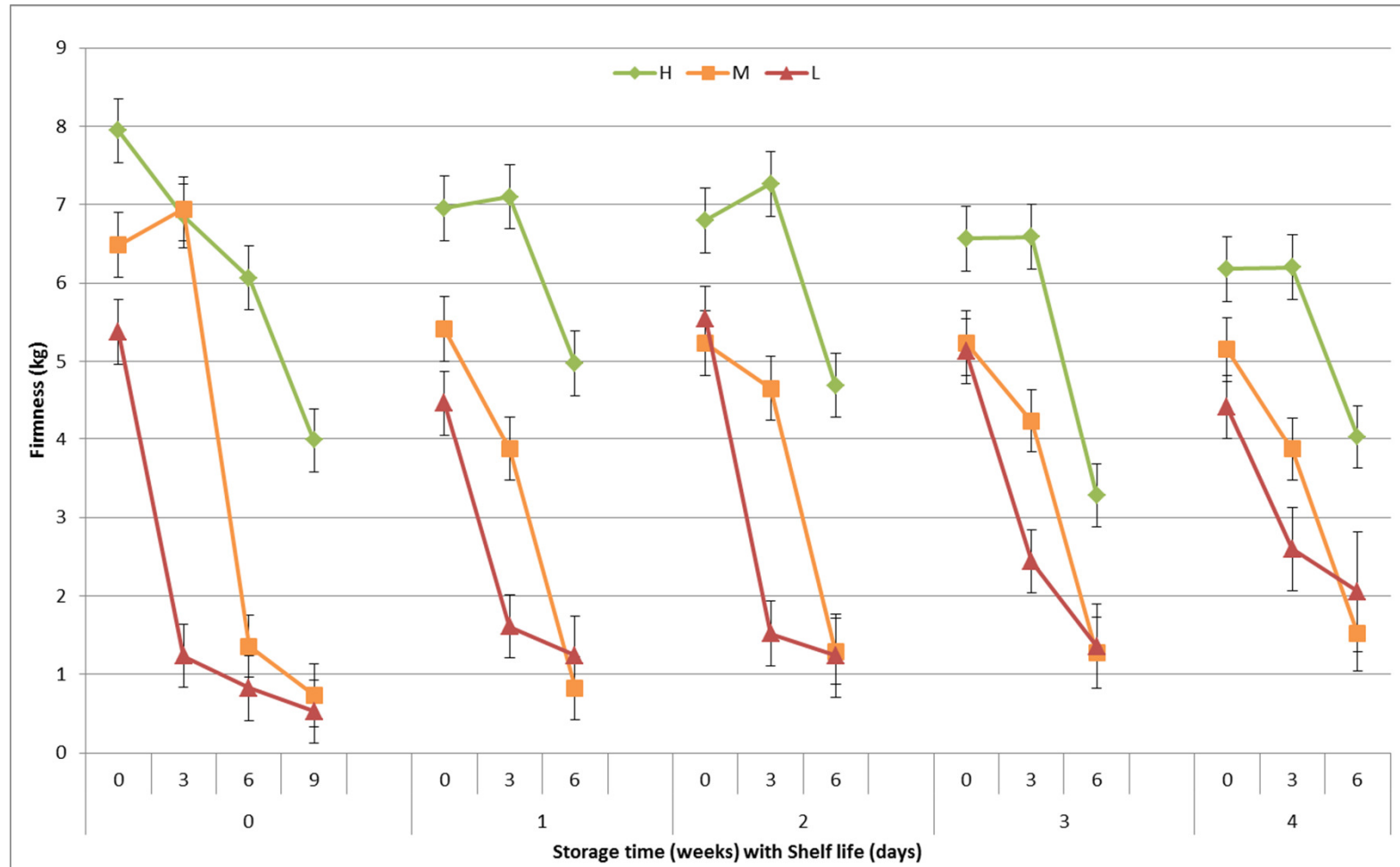
'Rose Bright' nectarine (2016-17)



Cold storage

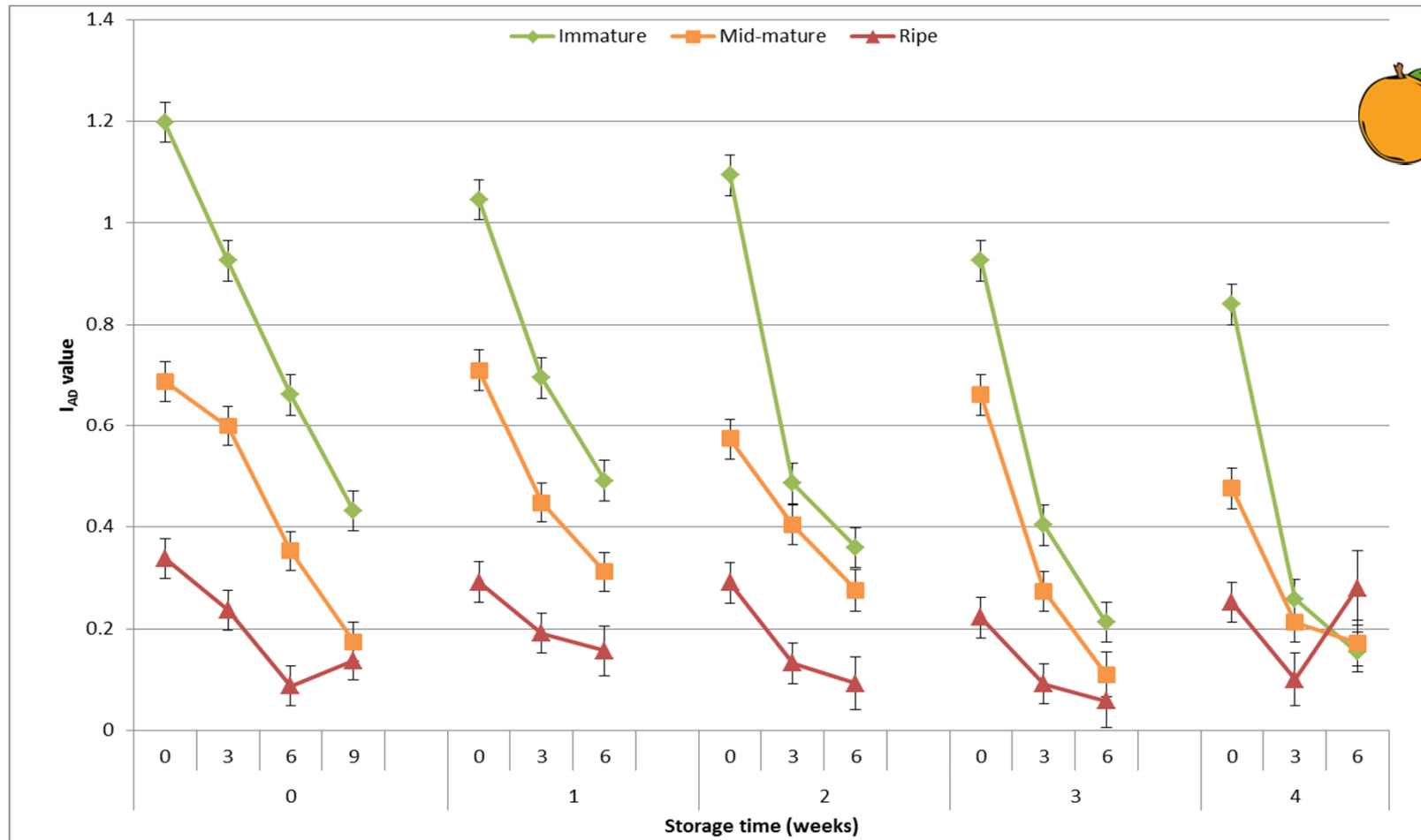


'Rose Bright' nectarine (2016-17)



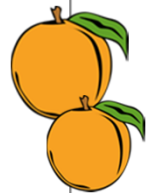
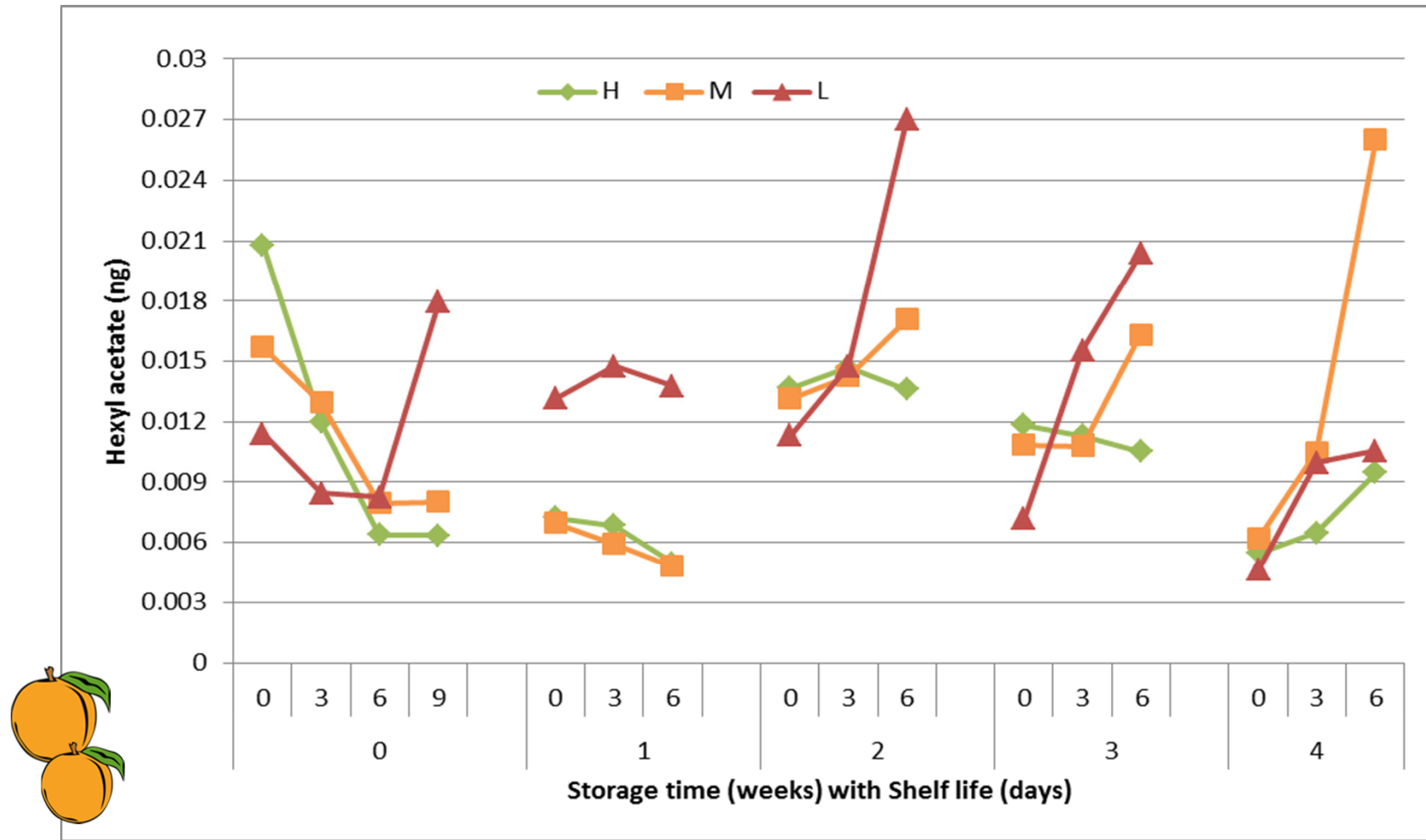
Cold storage

'Rose Bright' nectarine (2016-17)



Cold storage

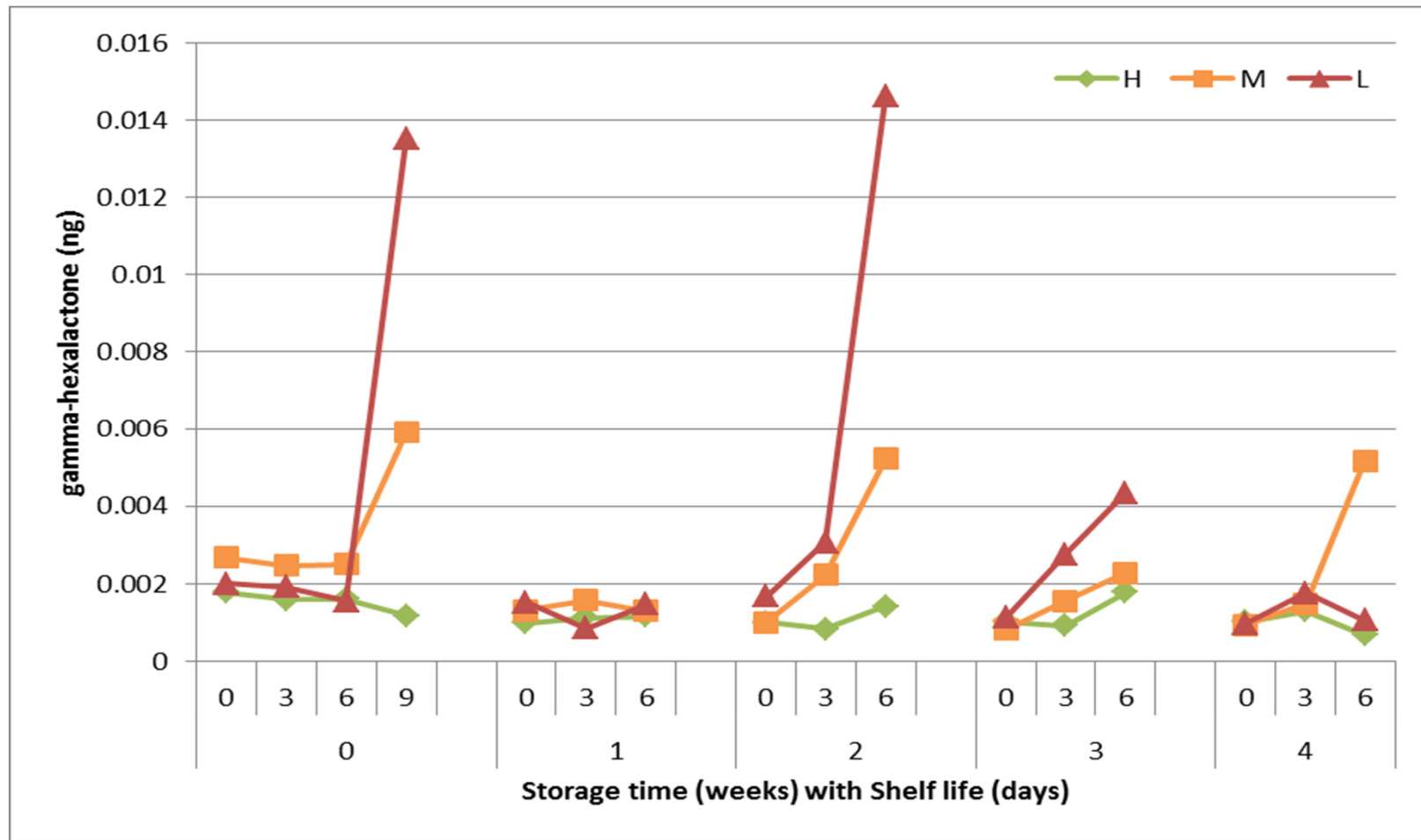
'Rose Bright' nectarine (2016-17)



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

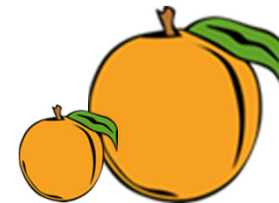
Collect: 'Snow Flame 25' peach;
'August Bright' nectarine;
'Snow Fall' peach;
'Ice Princess' peach

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.

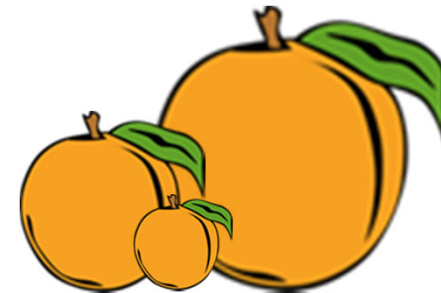
Cultivar selection for your intended market may be important as does harvest time within the season - early, mid, late.

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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