

Resin Canal Disorder (RCD) in Mango

Muhammad Umar

Dr Alistair Gracie, Dr Alieta Eyles, Prof Roger Stanley
ARC Training Centre for Innovative Horticultural Products
School of Land and Food, University of Tasmania

Looks Do Matter!



Appearance Quality has been a crucial factor for the consumer's purchase decision in Australia

Resin canal disorder (RCD)

- RCD is an emerging fruit quality defect in Australian mango industry
- Brown-black discolored resin canals in ripening mango
- 10-30% incidence rate in Australian mango industry
- Little is known about its causes and physiology



Ripe mango with skin on Ripe mango fruit with skin off

The Problem: Many potential causes

- Farm Location
- Farm management

Farm



- Maturity
- Harvesting dates
- Harvesting conditions
- Physical injury

Harvest



- Fruit processing
- Handling and transportation

Postharvest



- Bacteria
- *Enterobacter* sp.
and *Pantoea* sp.

Pathogens



Macnish 2014-15

Challenges

- Difficulty detecting at an early stage of harvest and throughout the supply chain
- Irregular occurrence, significant in some seasons
- Consumers perception



Pilot Study: RCD in Hobart

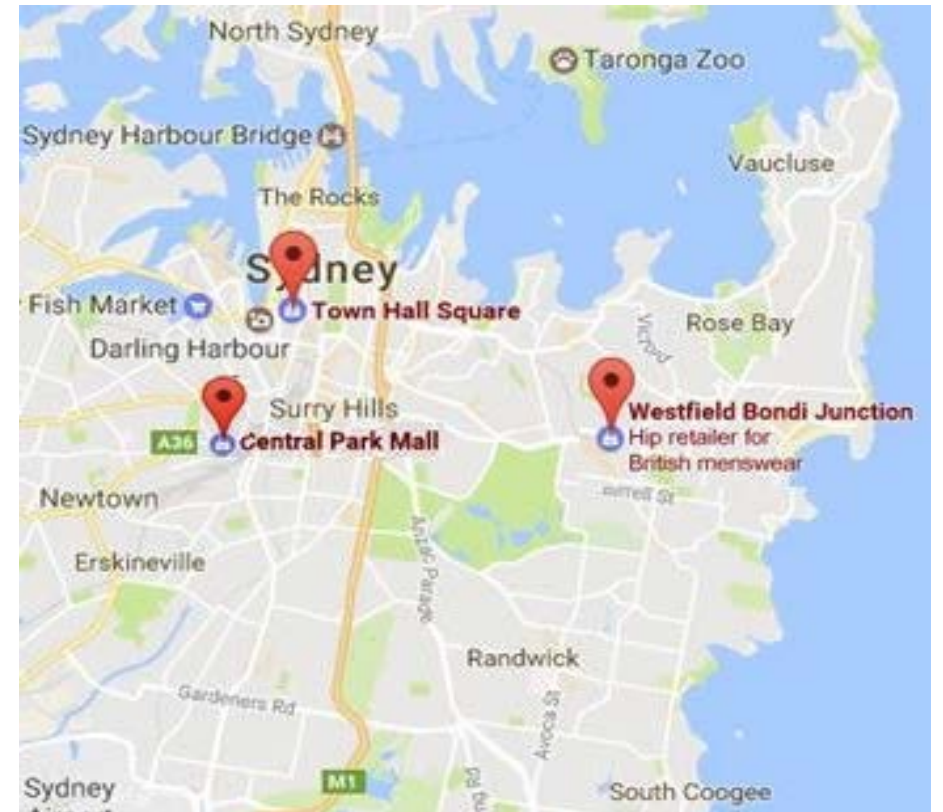
Retail stores survey in Hobart (Nov-2016)

- Fruit sampled from supermarkets
- 23% fruits showed RCD symptoms



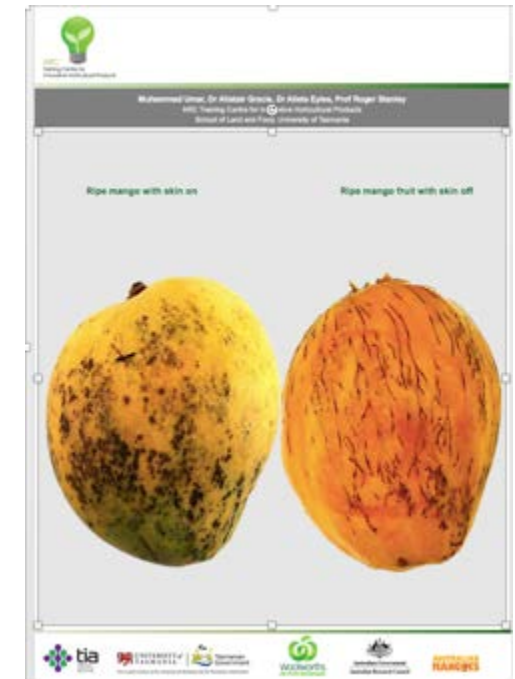
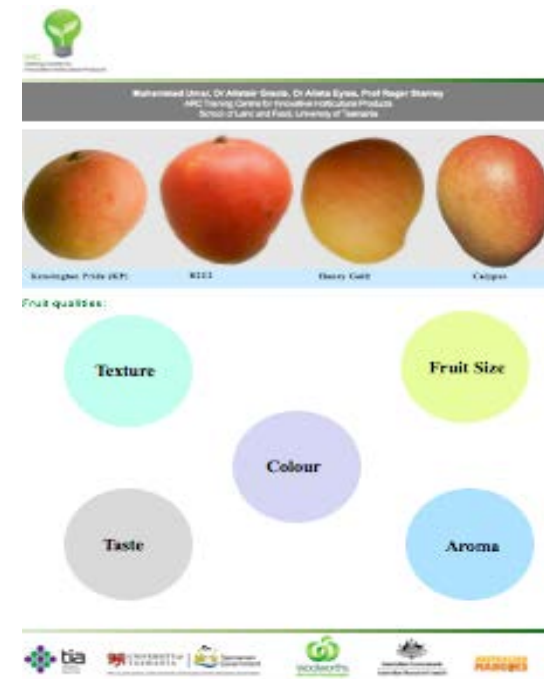
Survey study: Consumers perception

1. Bondi Junction
 2. Town Hall
 3. Central Park
- 135 consumers surveyed (59% female, 41% male)
 - 3 production store managers

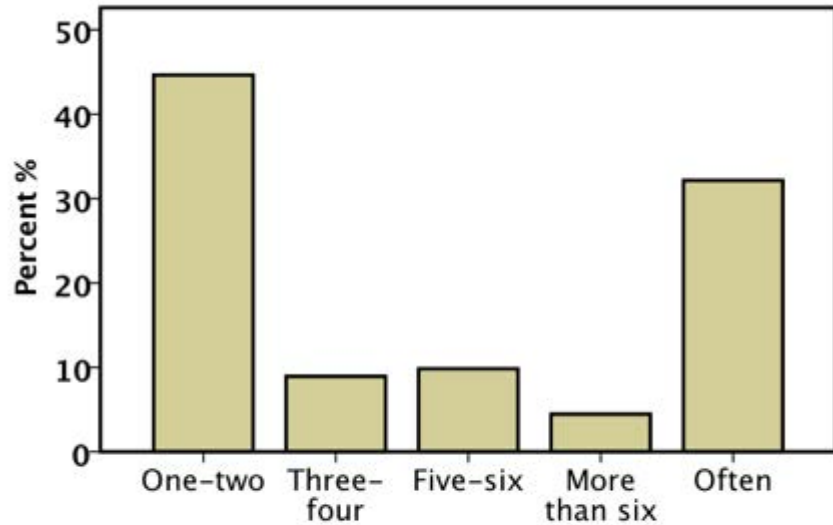


Survey study: method

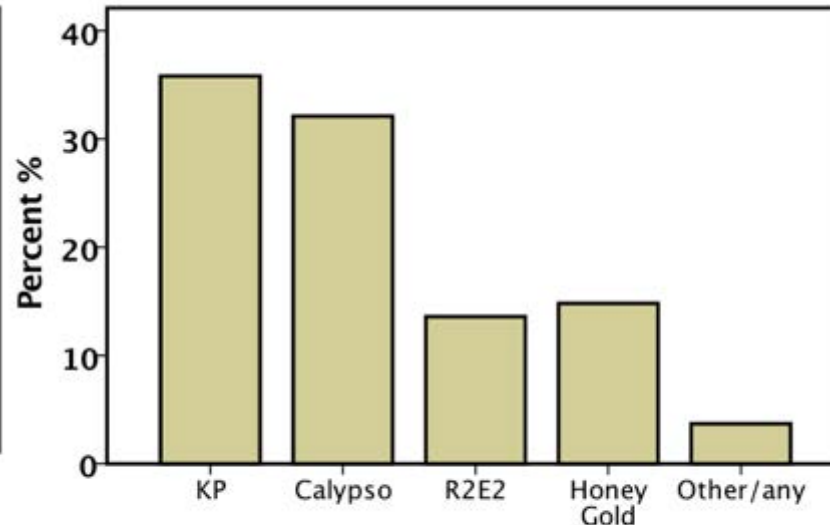
- Questions about purchasing behaviour
- Consumers' perceptions about fruit quality
- Mango cultivars
- Resin canal disorder
- Willingness to buy and consume RCD affected fruit



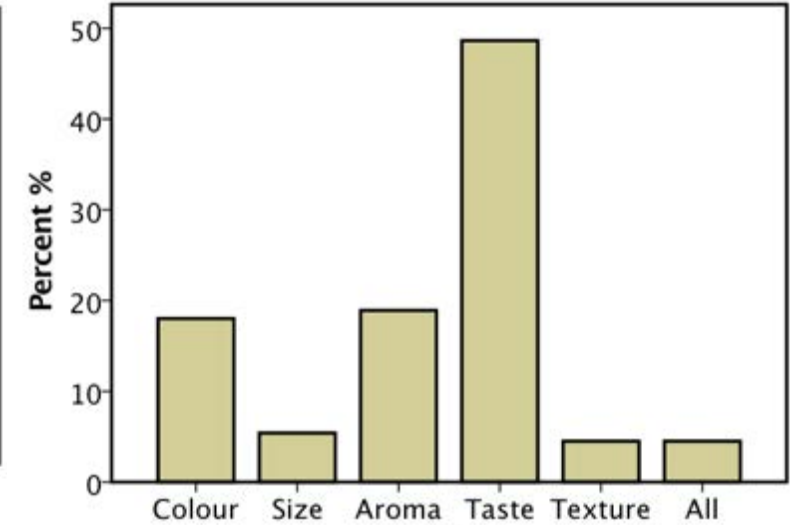
Consumers survey outcomes



How many mangoes do you usually buy per week?

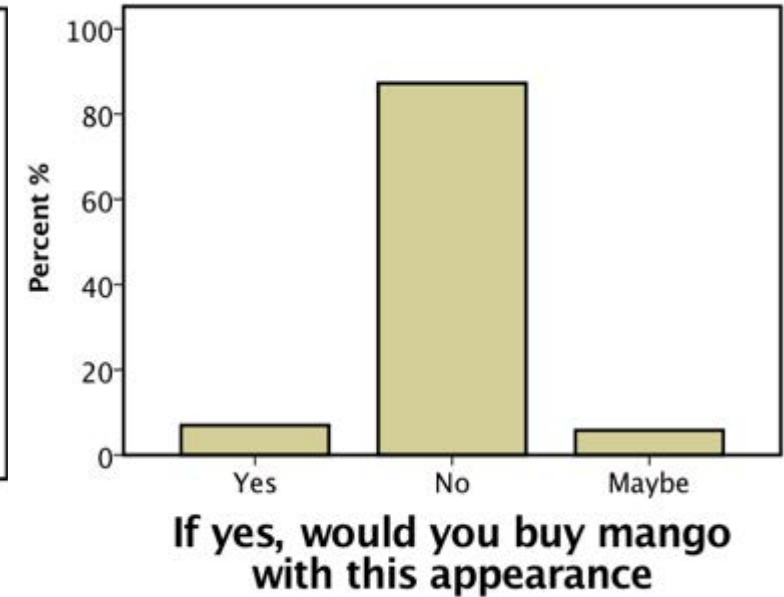
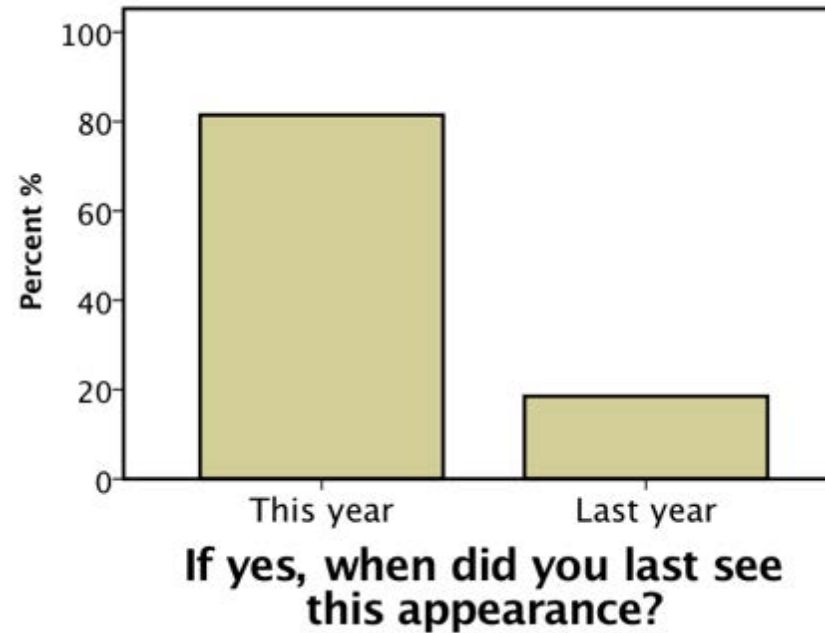
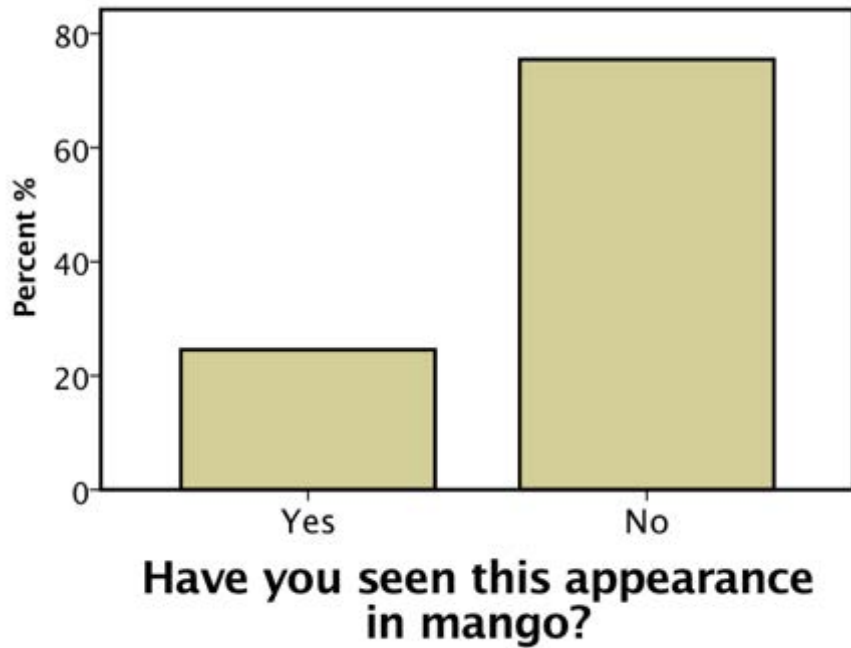


Do you like to buy a specific variety of mango?

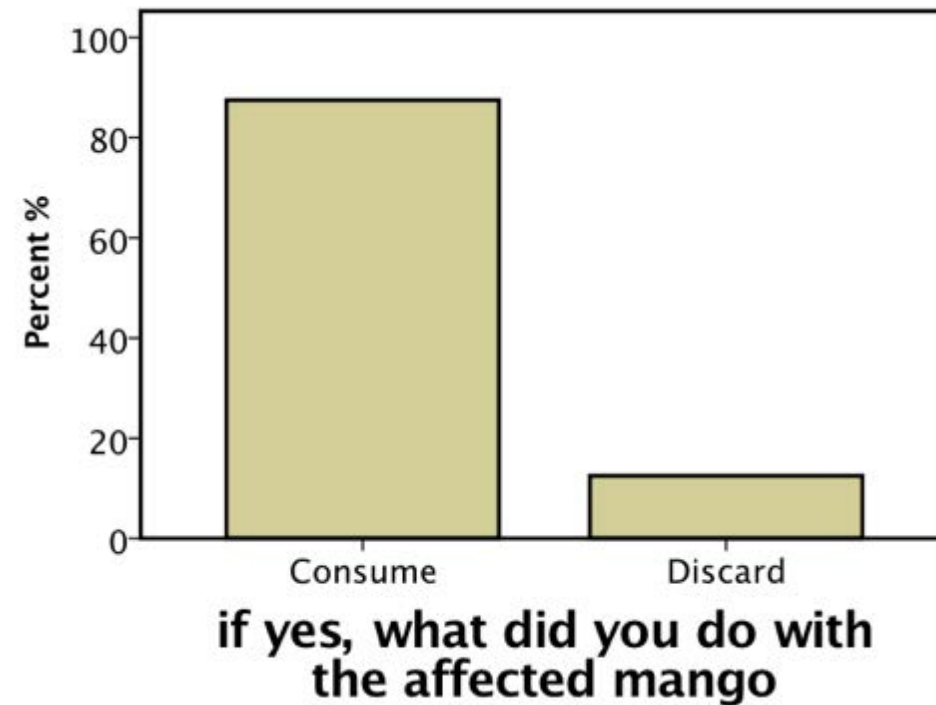
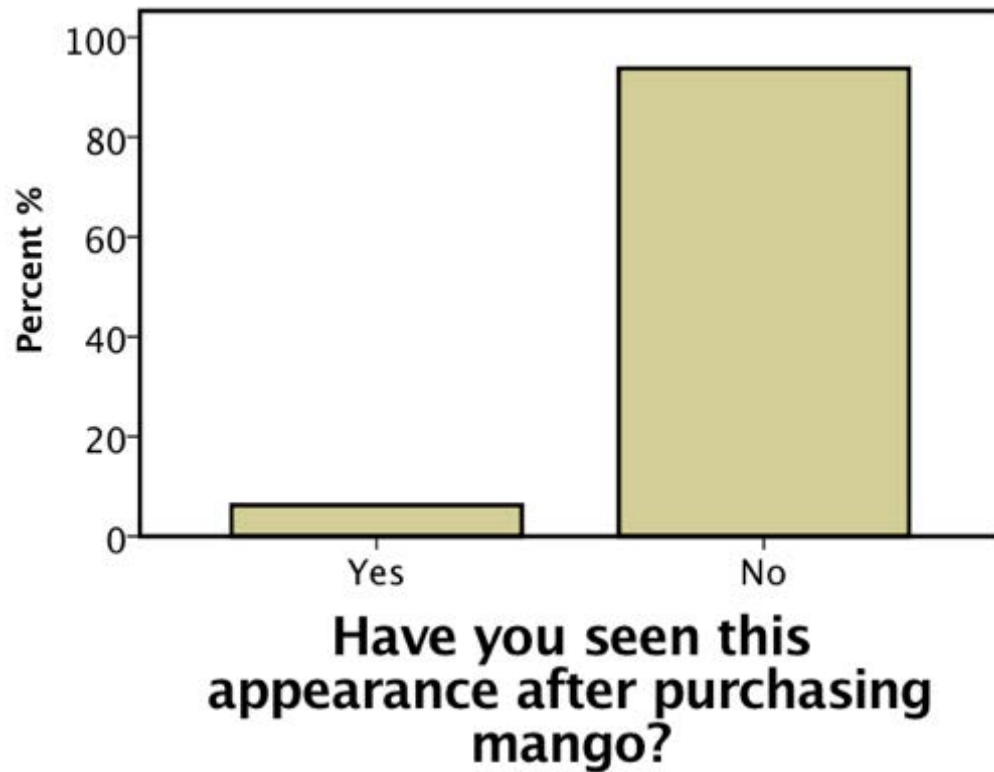


Importance of fruit attributes

Consumers survey outcomes



Consumers survey outcomes



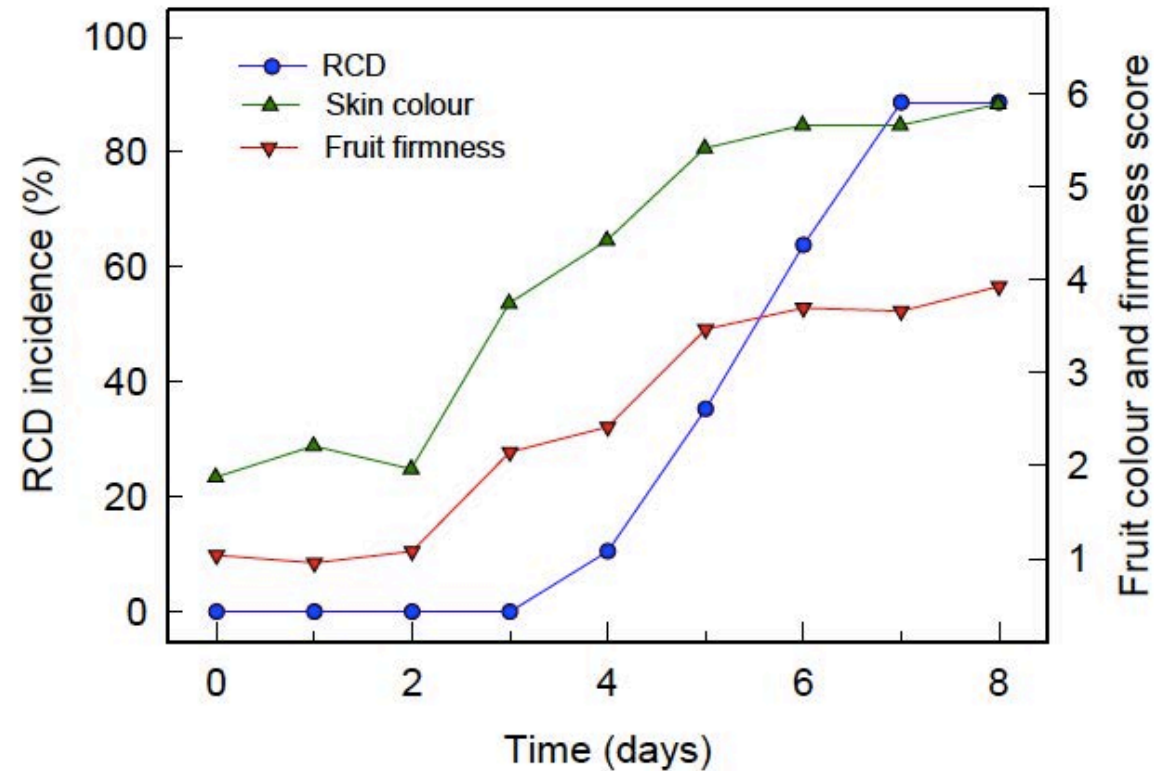
Summary of Production store managers' observations

Store 1	Seen RCD in ripe fruits, no formal consumer complaints this season, less than 5% of fruits affected by RCD
Store 2	No RCD
Store 3	Seen RCD in ripe fruits, no formal consumer complaints this season, less than 5% of fruits affected by RCD

Summary so far...

- RCD is affecting consumers perceptions about fruit quality and willingness to buy mangoes
- Demand for defect free fruits
- ~5% fruit loss at retail level due to RCD

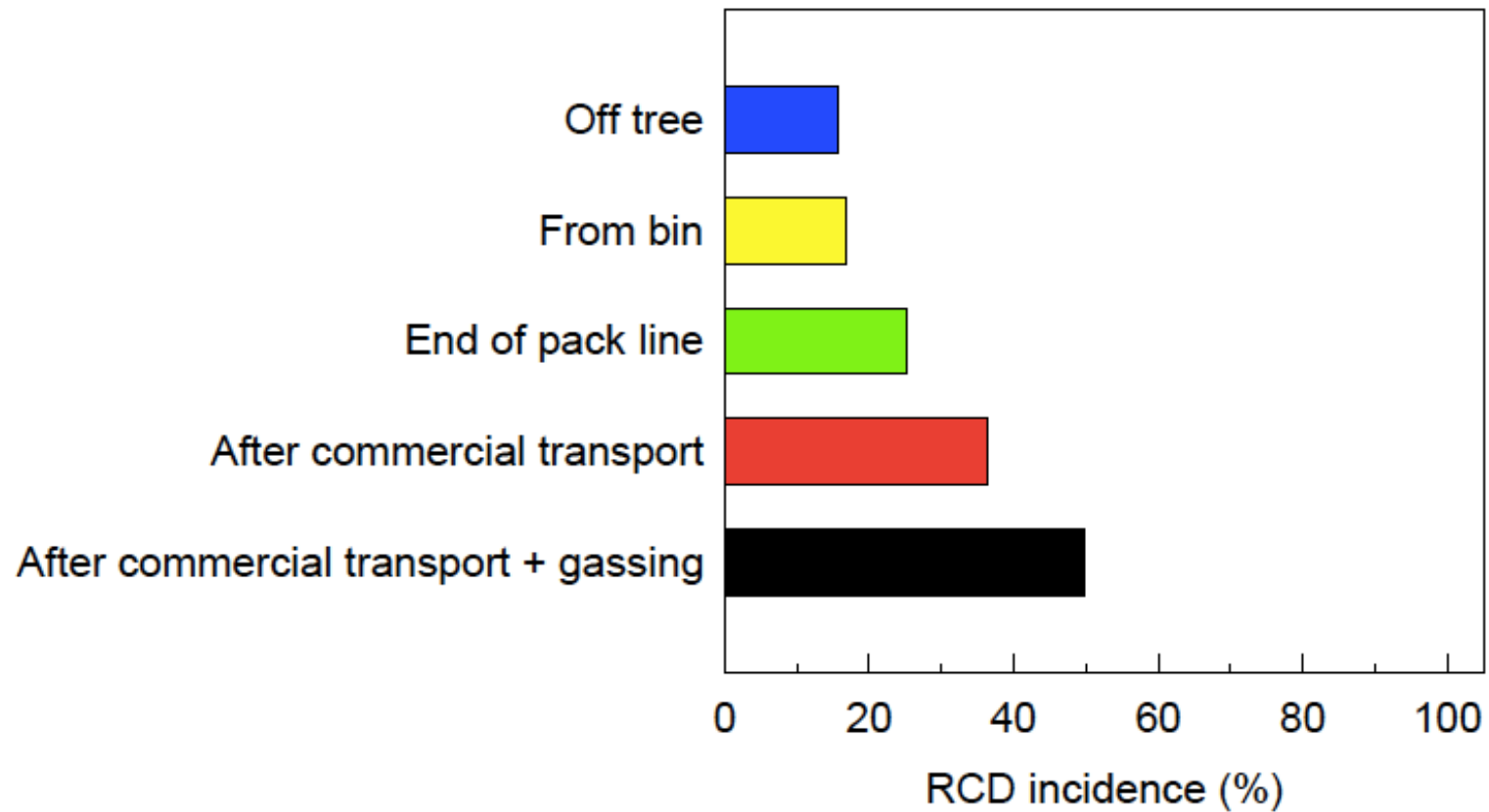
Way forward : Review



- RCD reaches a maximum at the eating ripe stage

Source: Macnish 2014-15

Appearance of RCD incidence along the supply chain



Source: Macnish 2014-15

Way forward: Review

- Effects of harvest maturity on RCD

Harvest #	Dry matter (%)	Skin		Flesh	
		Incidence (%)	Severity (%)	Incidence (%)	Severity (%)
1	12.7	49	52	66	57
2	14.6	30	36	43	39
3	16.9	32	17	47	18

- RCD was highest for fruit picked early

Source: Macnish 2014-15

Early detection of RCD: Dry Matter Content (DM)?

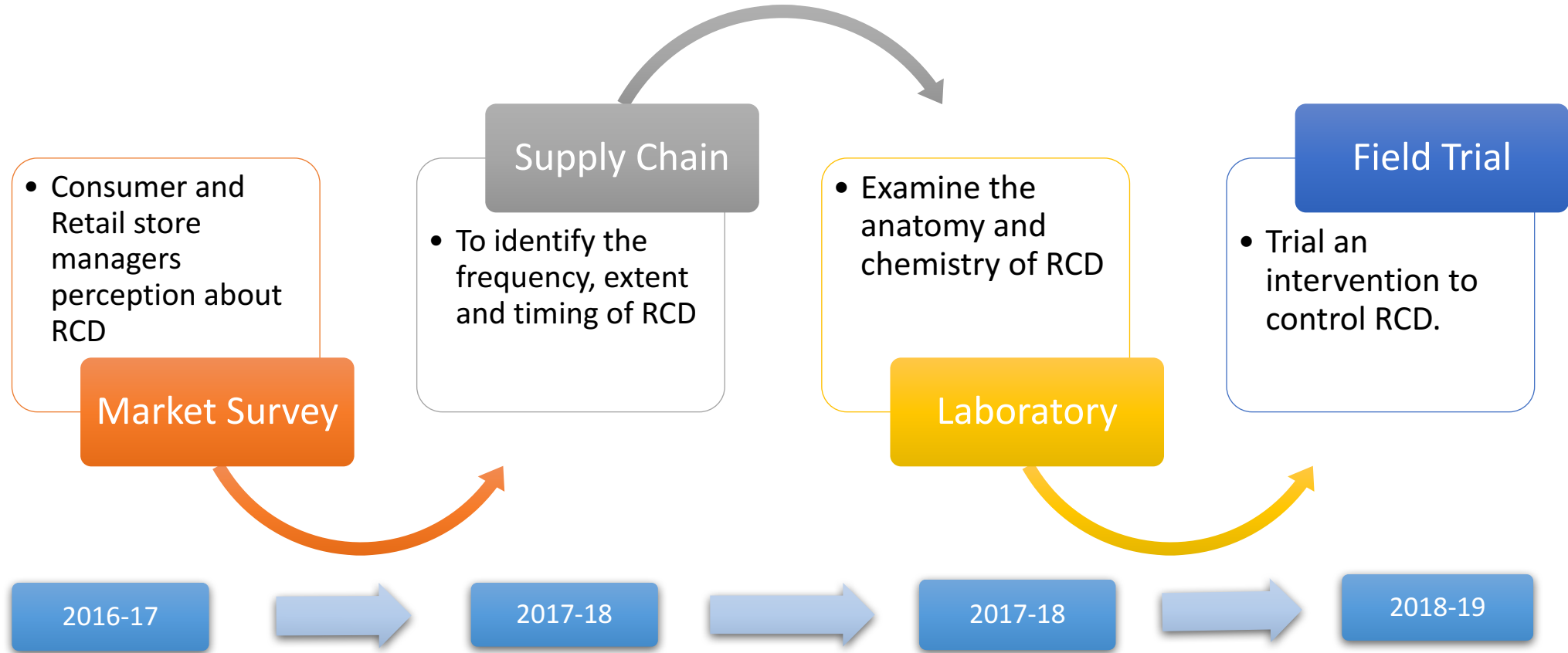
- DM has a strong relationship with physiological and harvest maturity in healthy mangoes
- Is this relationship affected by RCD?
- Can we use DM as an indicator of RCD at different maturity stages?

Way forward : methods

- Non-destructive technique
- Felix F-750 Produce Quality Meter (NIR)
- Dry matter content (DM)
- I will also assess other quality parameters
 - Total Soluble Solids (TSS)
 - Titratable acidity
 - Skin colour



Way forward : Research plan



Acknowledgement

- Dr Andrew Macnish (Department of Agriculture, Fisheries, Qld)
- Dr Cameron McConchie (DPI Northern Territory)
- Prof Daryl Joyce (University of Queensland)
- Mr Brice Lamarque (Woolworths)



Acknowledgement



Australian Government

Australian Research Council

The ARC Industrial Transformation Training Centre for Innovative Horticultural Products is supported through funding from the Australian Research Council's Industrial Transformation Training Centres scheme (project number IC140100024).