


# Avocado sunblotch disease



A healthy tree....or not?



Budwood taken from  
symptomless carrier trees  
will spread the disease

High % transmission from  
the seed of symptomless  
carrier trees

Pollinators from infected trees can  
infect healthy trees...but only the  
pollinated embryo will bear a  
symptomatic fruit.

# A healthy tree....or not?

# ASBVd-infected trees

## Symptomatic trees

- Recognisable
- Uneven distribution in a tree
- Easier to manage
- 15 to 30% yield reduction

## Asymptomatic trees

- Appear as healthy
- Even distribution in a tree
- Challenging to manage
- 50% to 80% yield reductions



Asymptomatic tree

Symptomatic tree



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# Avocado sunblotch viroid: the challenge of symptomless carrier trees in disease management

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*10<sup>th</sup> World Avocado Congress  
Auckland, New Zealand  
5 April 2023*

# Research questions



What is the impact of ASBVd-infected symptomless carrier trees on tree morphology, fruit maturity, yield and quality of 'Hass' avocado ?



What management strategies should be in place to contain the spread of ASBVd in orchards?

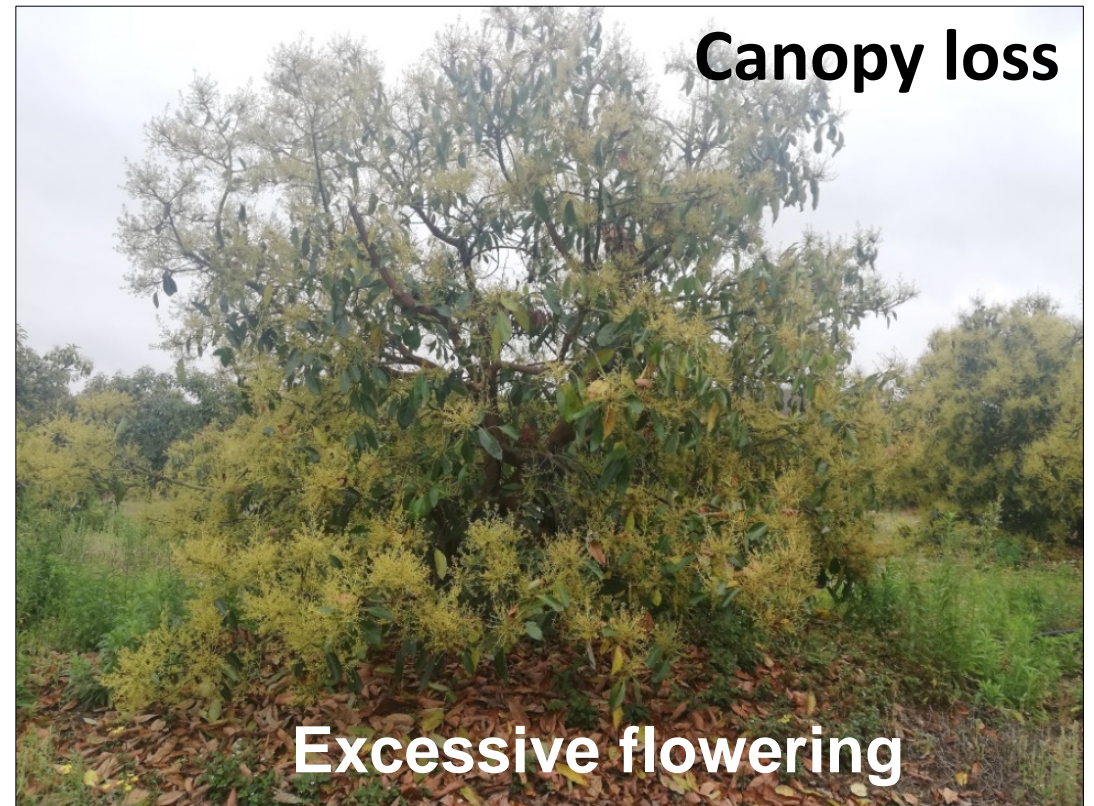
# Impact of ASBVd infection in asymptomatic trees compared with healthy trees

- Orchard selection and field selection of trees
- Seasonal monitoring of trees – flowering and fruit set stages
- Effect on fruit ripening, internal and external qualities of fruit
- Yield

# Flowering

**Healthy**

**Infected**







Symptomless tree: Abnormal heavy flowering and flower abscission at the end of flowering stage

# Fruit set

**Healthy**



**Infected**



# External quality of fruit

- Skin spotting
- Discrete patches
- External rots
- Shrivel

# External quality of fruit

Direct ripening		
Infection level	External rot (%)	Shrivel (0-3)
Healthy	4.2 ± 2.9 b	0.54 ± 0.52 a
Low	<b>28.3 ± 20.2 a</b>	1.3 ± 0.58 a
Medium	<b>27 ± 14.4 a</b>	1.4 ± 1.08 a
High	<b>30.8 ± 15.9 a</b>	1.5 ± 1 a
P value	<0.001	0.06
F value	10.2	2.938
Stored fruit		
Infection level	External rot (%)	Shrivel (0-3)
Healthy	0 ± 0 a	0 ± 0 a
Low	0 ± 0 a	0 ± 0 a
Medium	0 ± 0a	0 ± 0 a
High	<b>5 ± 4.5 b</b>	<b>1 ± 0.63 b</b>
P value	<0.001	<0.001
F value	8.944	17.89

# Direct ripening

**Healthy**



**Infected**



**Ripens quicker**

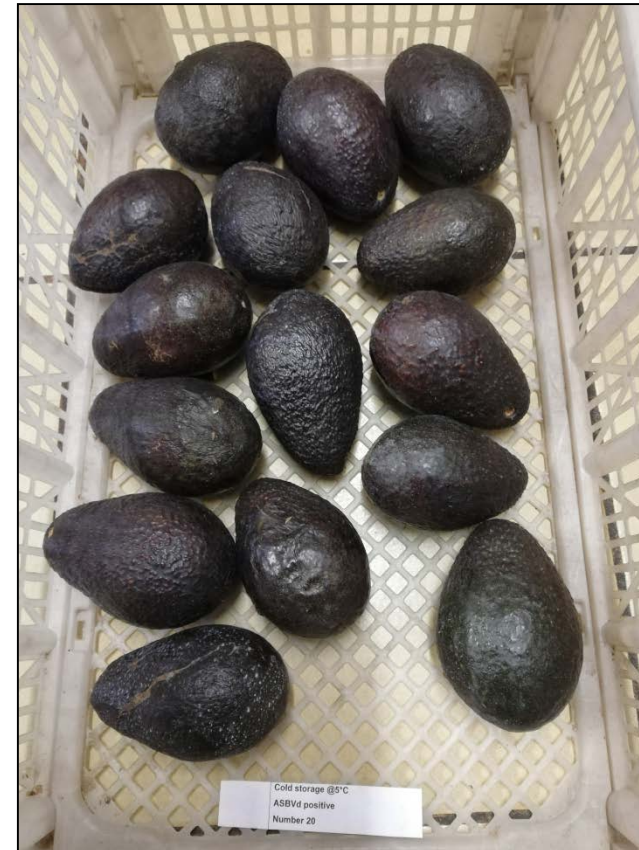
**More susceptible to external rots**

# Cold storage

## Healthy



## Infected



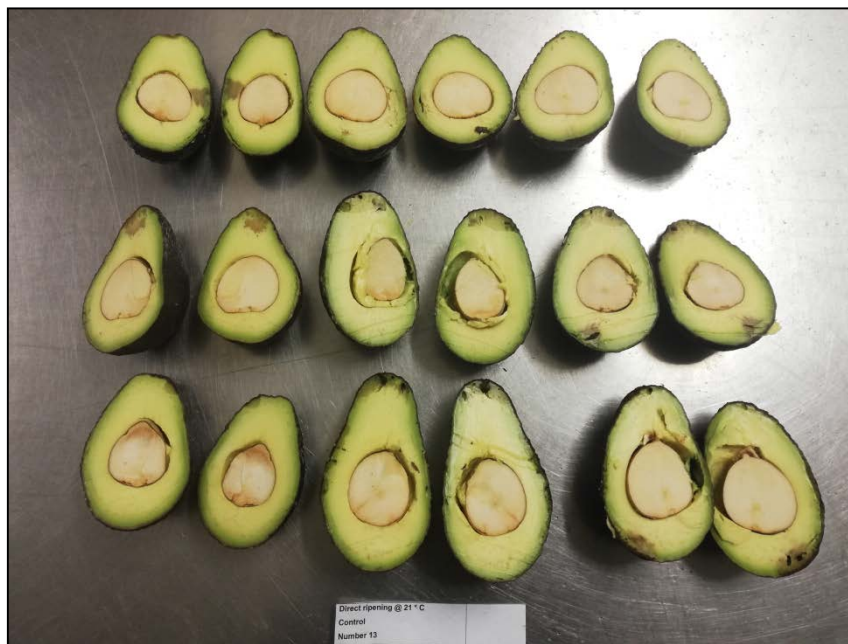
**Early softening and color change ( $p \leq 0.05$ )**

# Internal quality of fruit

- Flesh bruising
- Diffuse flesh discolouration
- Vascular browning
- Stem end rot
- Body rots

# Direct ripening

## Healthy



## Infected



**Bruising** ( $p \leq 0.05$ )

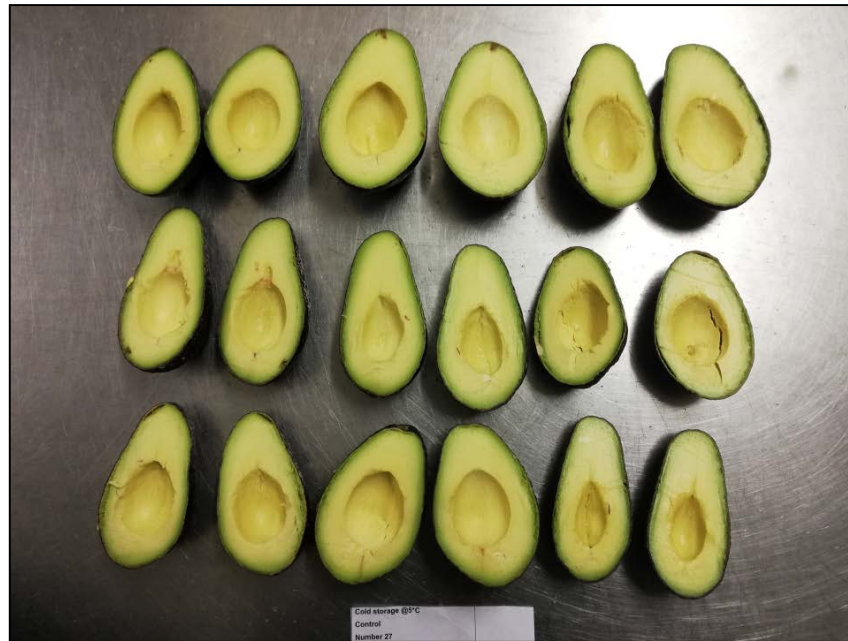
**Diffuse flesh coloration 20.5% higher** ( $p \leq 0.05$ )

**Stem end rots 17.1% higher** ( $p \leq 0.05$ )



# Cold storage

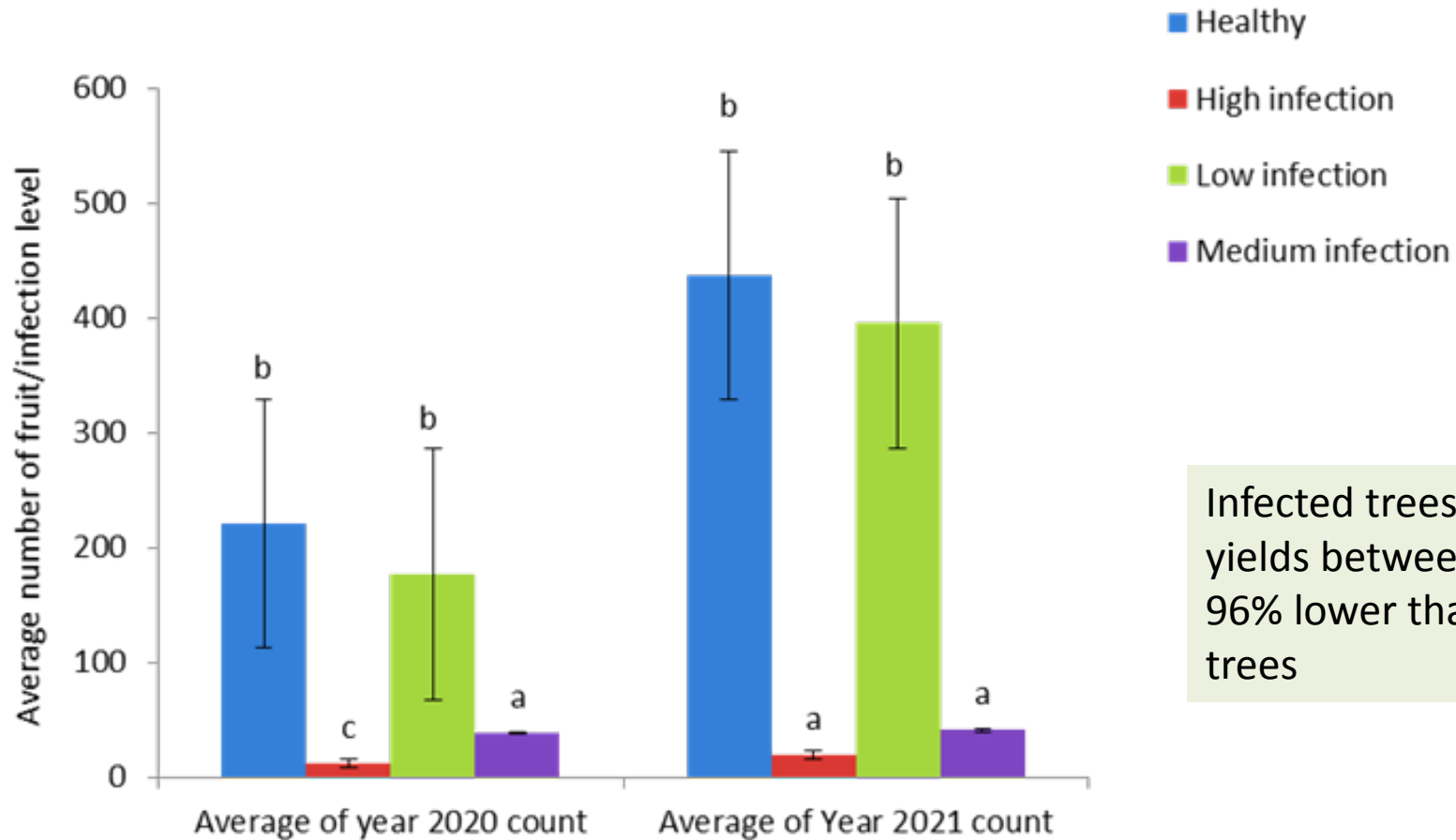
## Healthy



## Infected



# Yield loss



Infected trees produced yields between 91% and 96% lower than healthy trees

# What did we learn?

- Field observations associated with ASBVd infection can be an indication of infection in 'Hass' trees
- Fruit from infected trees ripened faster than normal fruit and were more prone to fungal infections during the ripening process
- ASBVd affected the firmness and colour change of fruit
- To manage the symptomless trees in orchards are critical to prevent yield losses in the long term

# Management strategies

## Controllable strategies

- Disease status of seed sources
- Disease status of scion material
- Orchard sanitation practices
- Source trees from certified nurseries
- Regular scouting of orchards
- Systematic molecular testing of orchards
- **Removal of infected material**

## Influence from external factors

- Impact of honeybees/pollinators
- Infection through roots of adjacent plants
- Human error

# Acknowledgements

- Growers for assistance with field work and access to orchards for the impact study.
- Pathology team at ARC
- SAAGA for funding





BAIE DANKIE

THANK YOU

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