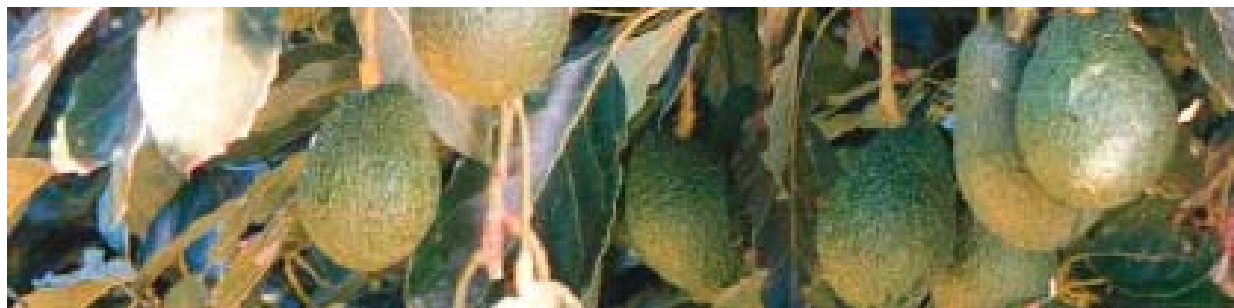




# SESSION THREE

*Session Three*  
Pest Disease Control  
Strategies, Integrated  
Production Systems and the  
Impact on Market Access

New Zealand and Australia Avocado  
Grower's Conference'05  
20-22 September 2005  
Tauranga, New Zealand



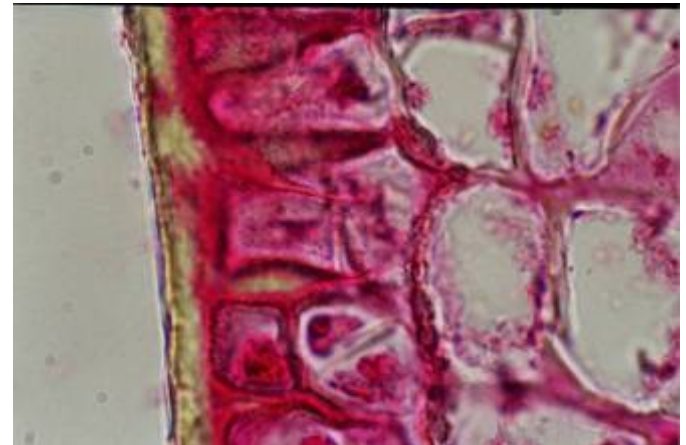
# New strategies to control avocado fruit diseases



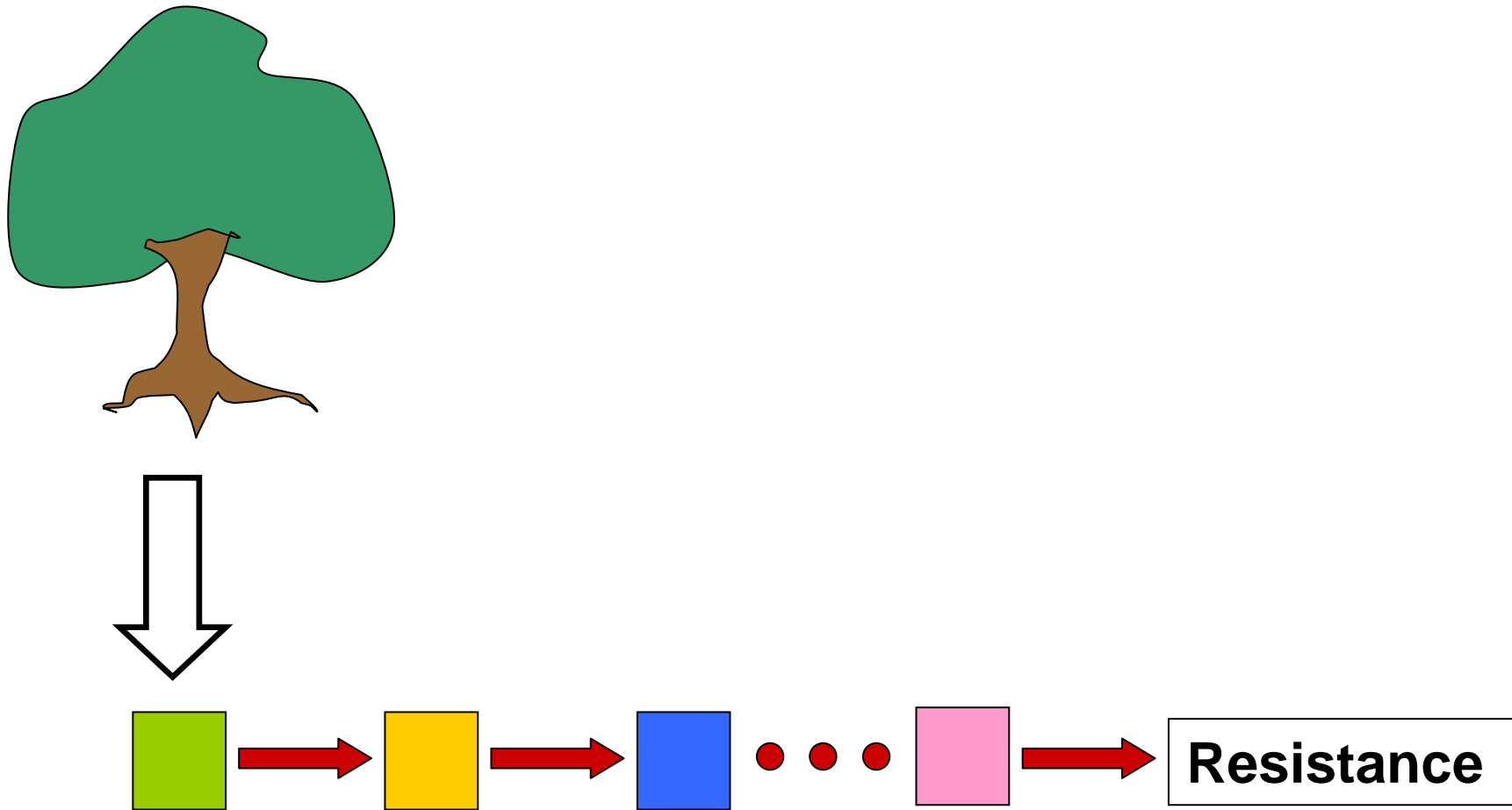
Jay Anderson, Sonia Willingham, Ken Pegg,  
Liz Dann, Lindy Coates, Luke Smith, Fiona  
Giblin, Jan Dean and Tony Cooke

# Disease resistance of plants

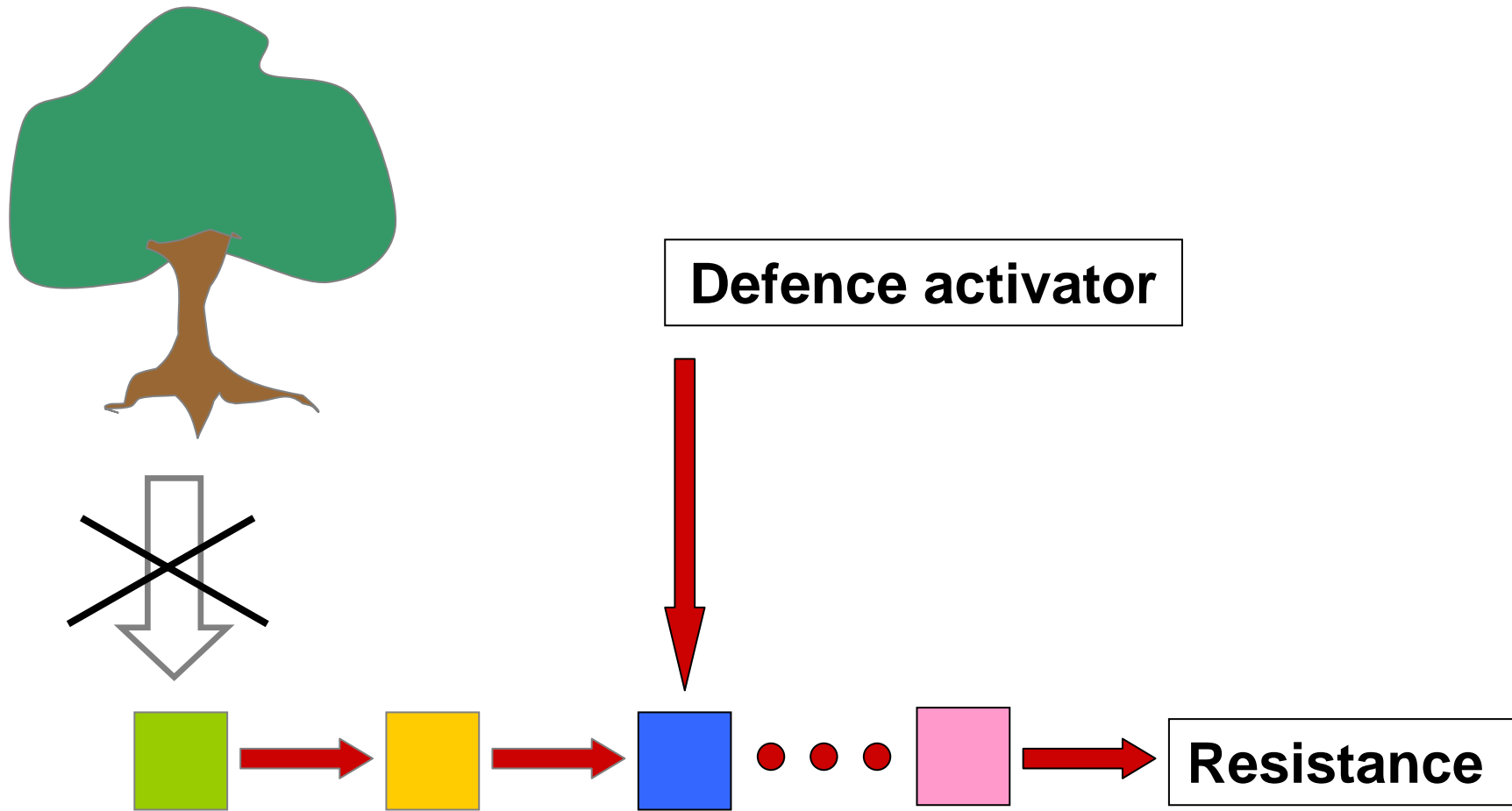
- All plants have some level of resistance
- Way in which they act?
  - Mechanical resistance
  - Biochemical resistance
- When do they act?
  - All the time
  - Pathogen encounter



# Induced defences

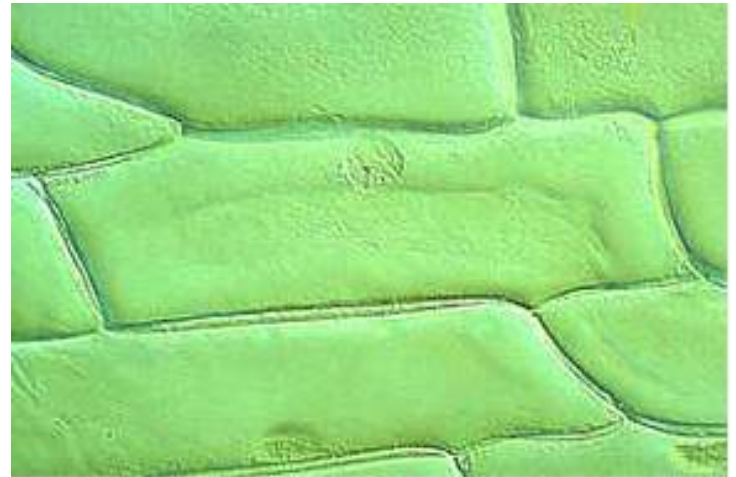


# Induced defences



# Silicon and disease resistance

- Silicon has long been associated with disease resistance
- e.g. Wagner (1940) – cucumber and powdery mildew
- Accumulating in cell walls and near pathogen entry points → mechanical resistance

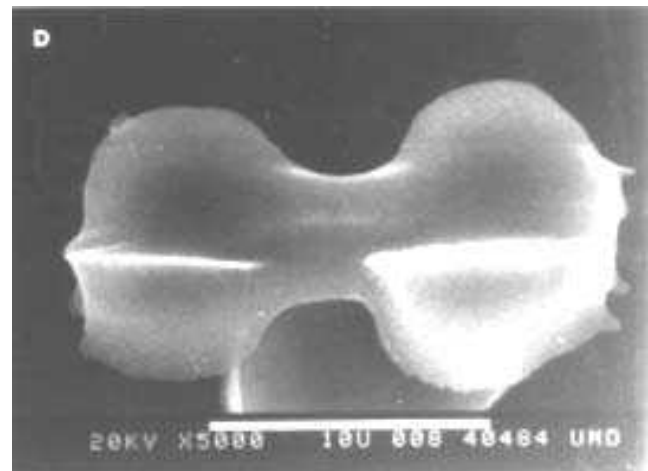
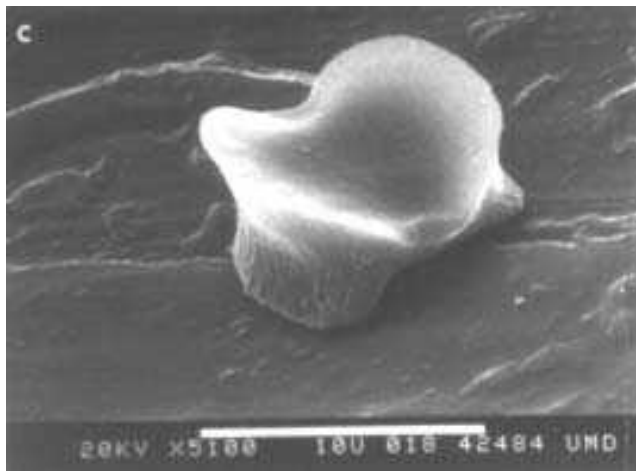
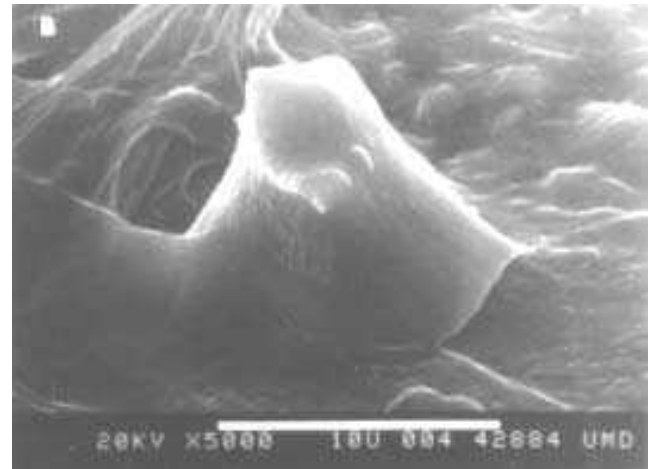
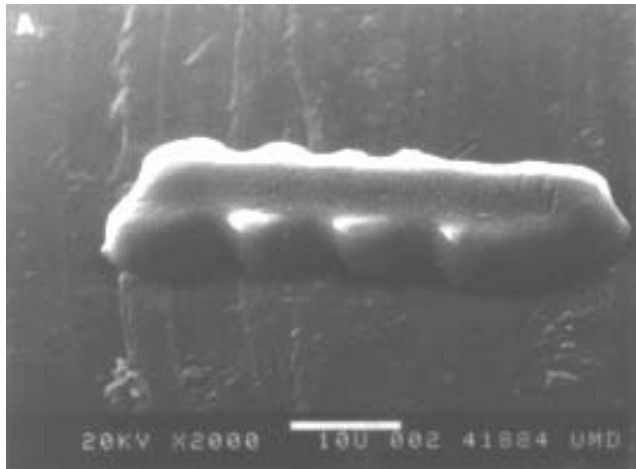


# Silicon and disease resistance

- Early 1990's → biochemical resistance
- Treating with silicon increased production of phenolic compounds
- Increased production of defence enzymes
- Correlates with lower incidence and severity of disease



# Phytoliths

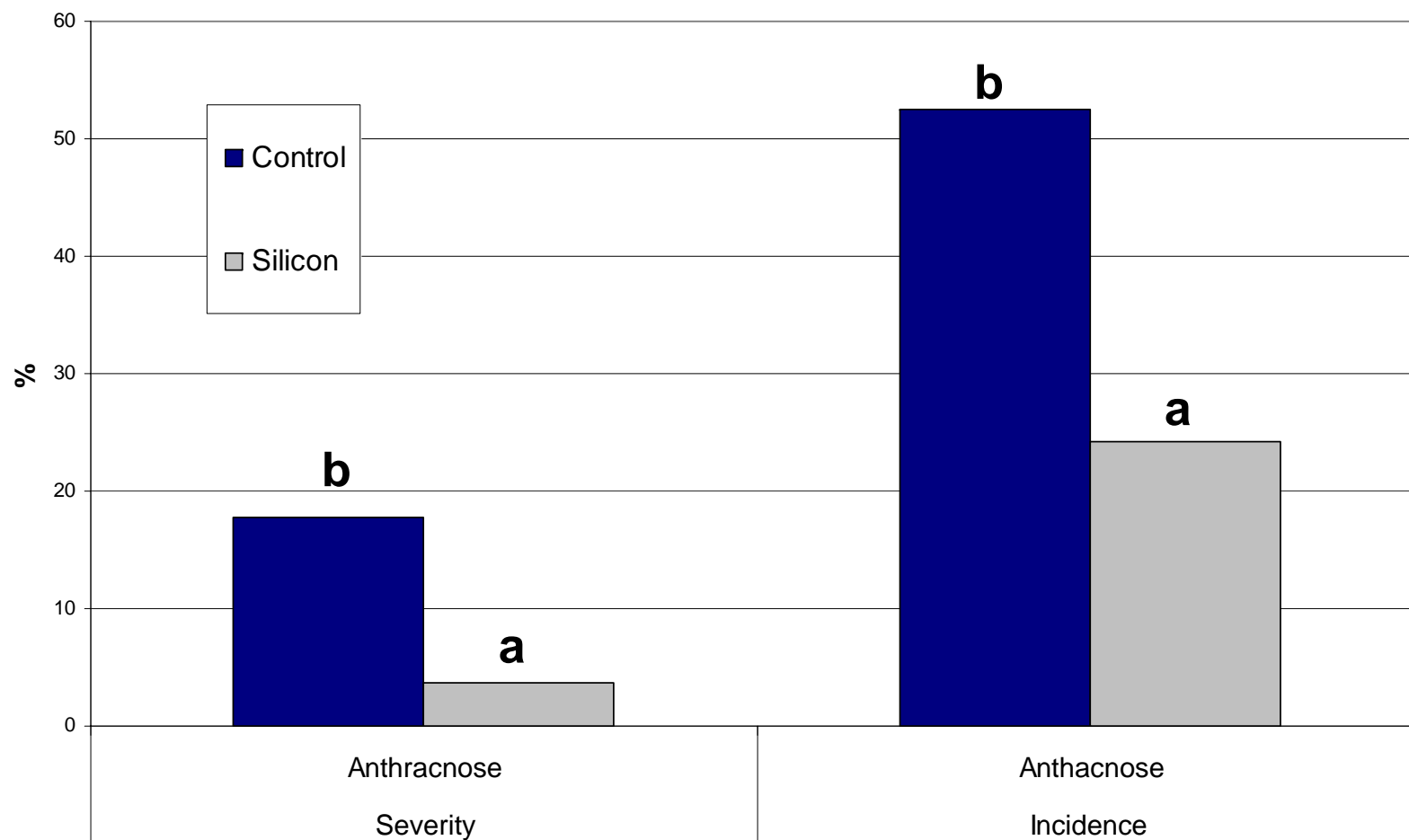


Source: University of Minnesota, Duluth [www.d.umn.edu/archlab/phy.htm](http://www.d.umn.edu/archlab/phy.htm)

# Silicon injection trial - 2004

- 'Hass' grafted to clonal 'Velvick'
- Tree injected with 1000ppm soluble silicon
- Harvested 8 and 12 weeks after treatment
- Ripened to encourage postharvest disease development

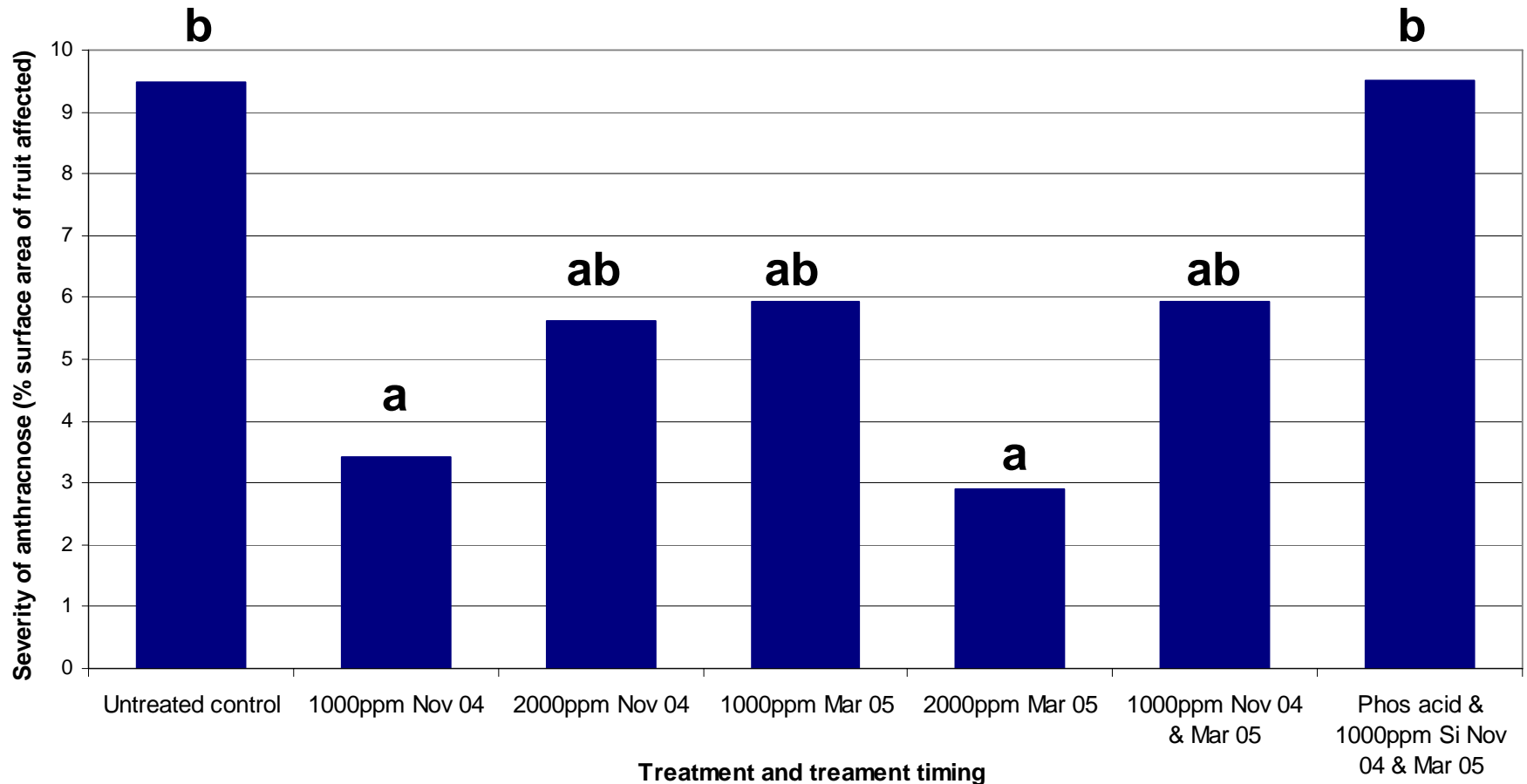
# Silicon injection trial - 2004



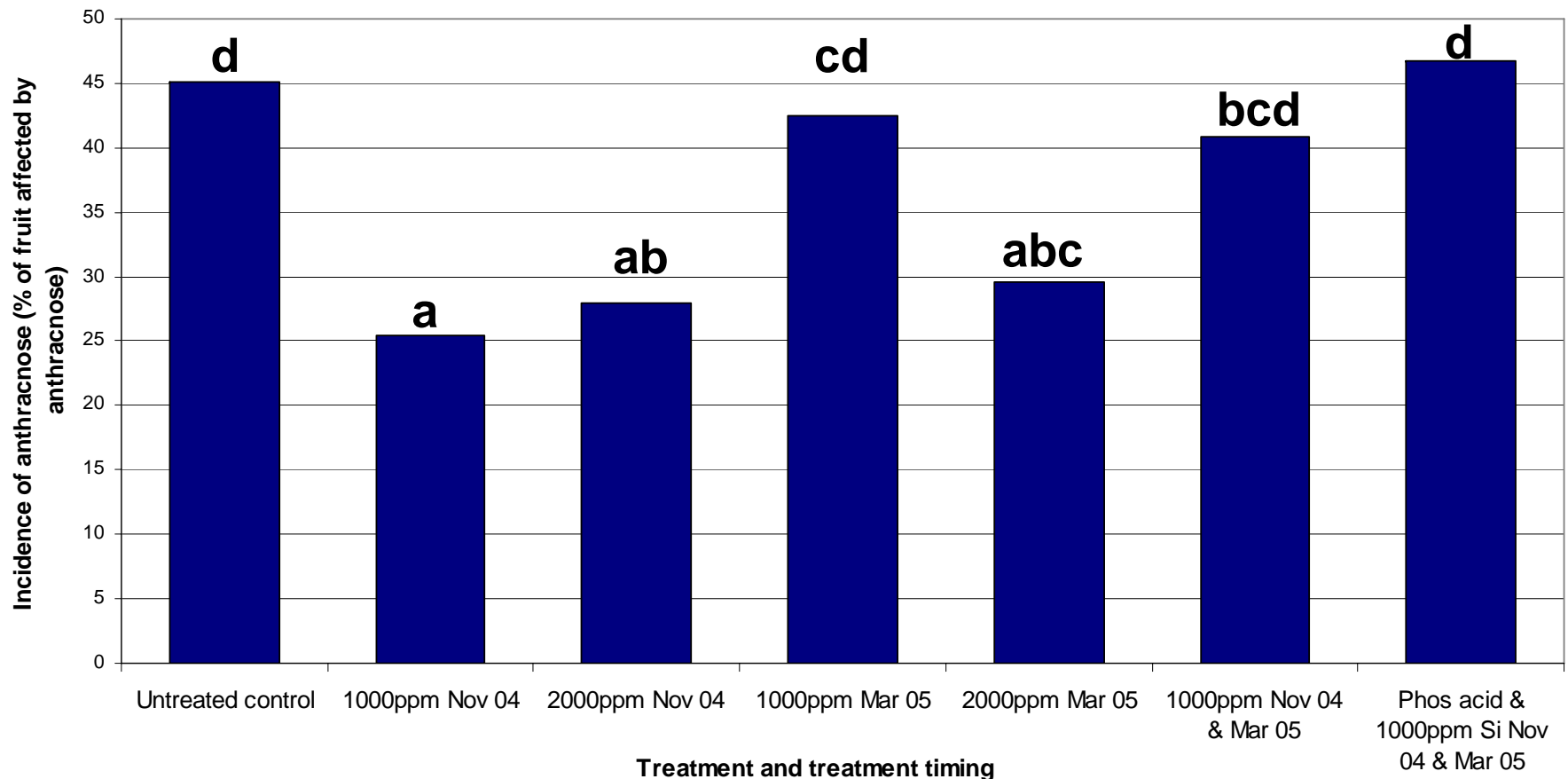
# Silicon rate and timing - 2005

- 'Hass' grafted to 'Edranol' or clonal 'Velvick'
- Tree injected with 1000 or 2000ppm soluble silicon
- Treated in November 04 and/or March 05
- Ripened to encourage postharvest disease development

# Silicon injection rate & timing – severity of anthracnose



# Silicon injection rate & timing – incidence of anthracnose



# Silicon rate and timing - 2005

- Decreased incidence and severity of anthracnose
- Earlier treatments better
- Combining soluble silicon with phos acid unsuccessful → polymerisation
- Applying through fertigation or soil applications may be more practical

# Further work

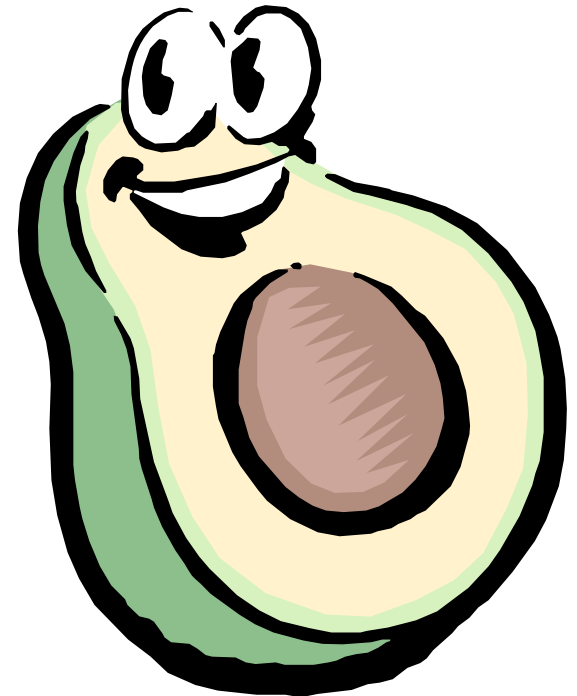
- Calcium silicate
- Magnesium silicate
- Potassium silicate and humic acid preparations
- Application methods





# In summary

- **Silicon treatments can decrease the incidence and severity of anthracnose of 'Hass' avocado**
- We are investigating the mode of action



# Acknowledgements



## Suppliers of silicon products

*Know-how for Horticulture™*



## Growers and Collaborators



**Queensland  
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**Primary Industries  
and Fisheries**

