Impacts of fruit disease management on quality

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Queensland Government

Topics covered

- Overview of anthracnose and stem-end rot
- Experimental results
  - Rootstocks, including nutrition
  - Crop load, including nutrition
- Integrated control
  - Field fungicides, including strobilurin group

Postharvest diseases

anthracnose

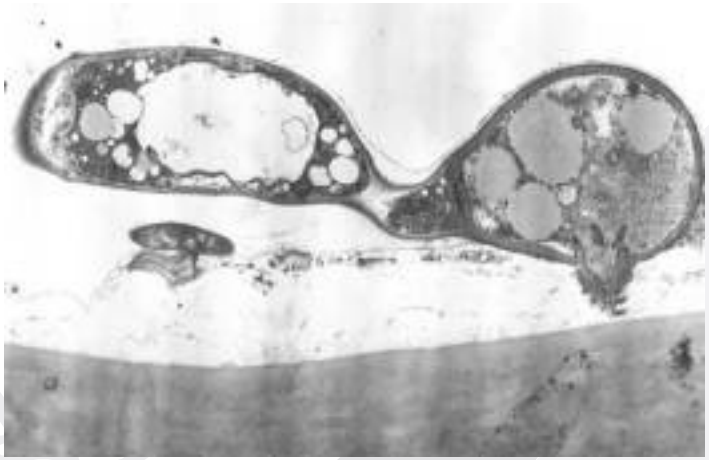
stem-end rot

Anthracnose (***Colletotrichum gloeosporioides***)

Infection occurs in field from fruit set to harvest

dormant period

Symptoms develop during fruit ripening



Stem-end rot (many fungi)

- ***Botryosphaeria*** spp
- ***Lasiodiplodia theobromae***
- ***Colletotrichum gloeosporioides***
- ***Phomopsis perseae***
- ***Thyronectria pseudotrichia***

Stem-end rot (SER) fungi colonise the stem tissue of avocado trees without causing disease

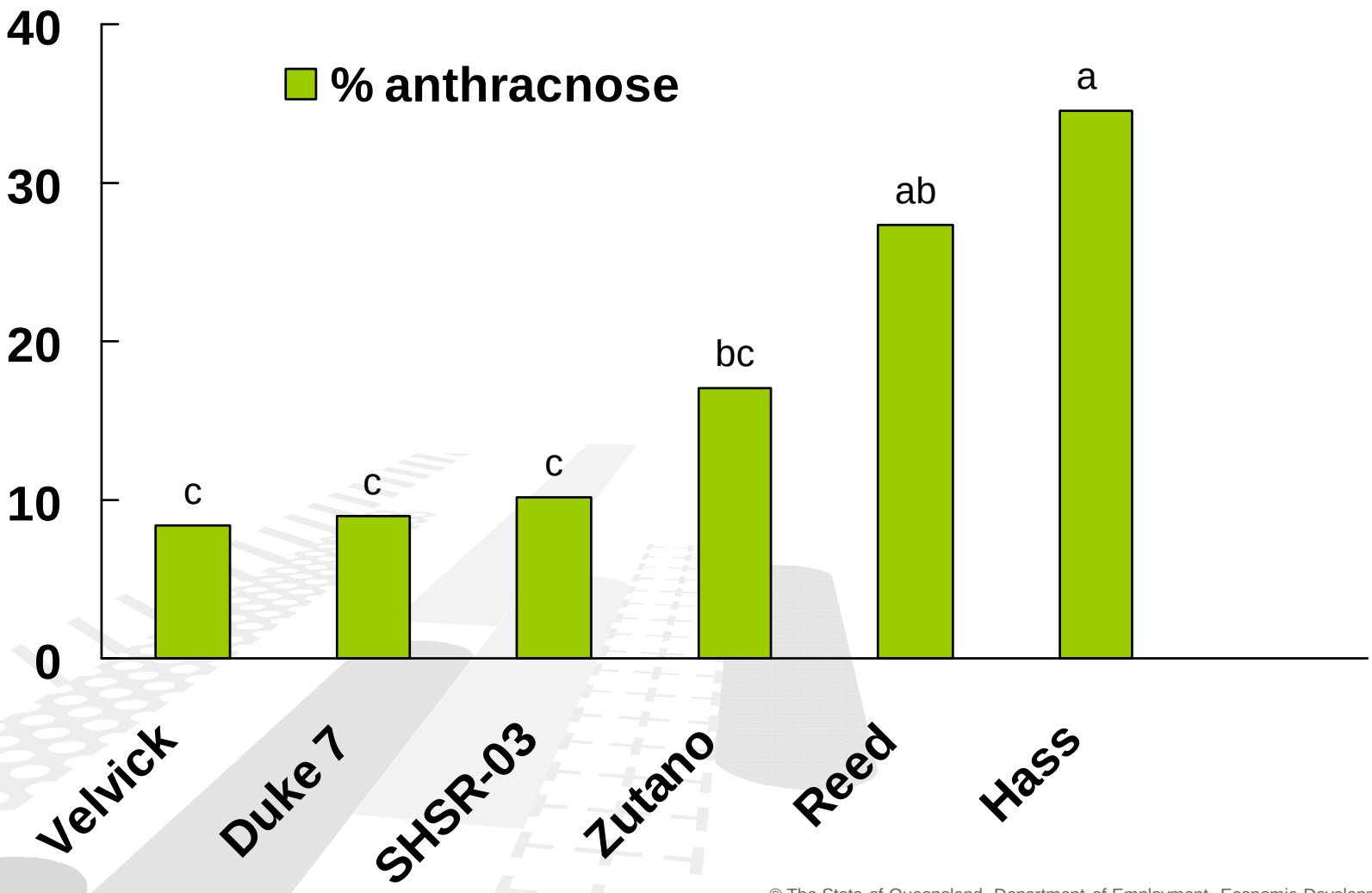
Symptoms develop during fruit ripening

Effect of rootstock on fruit quality & major nutrients

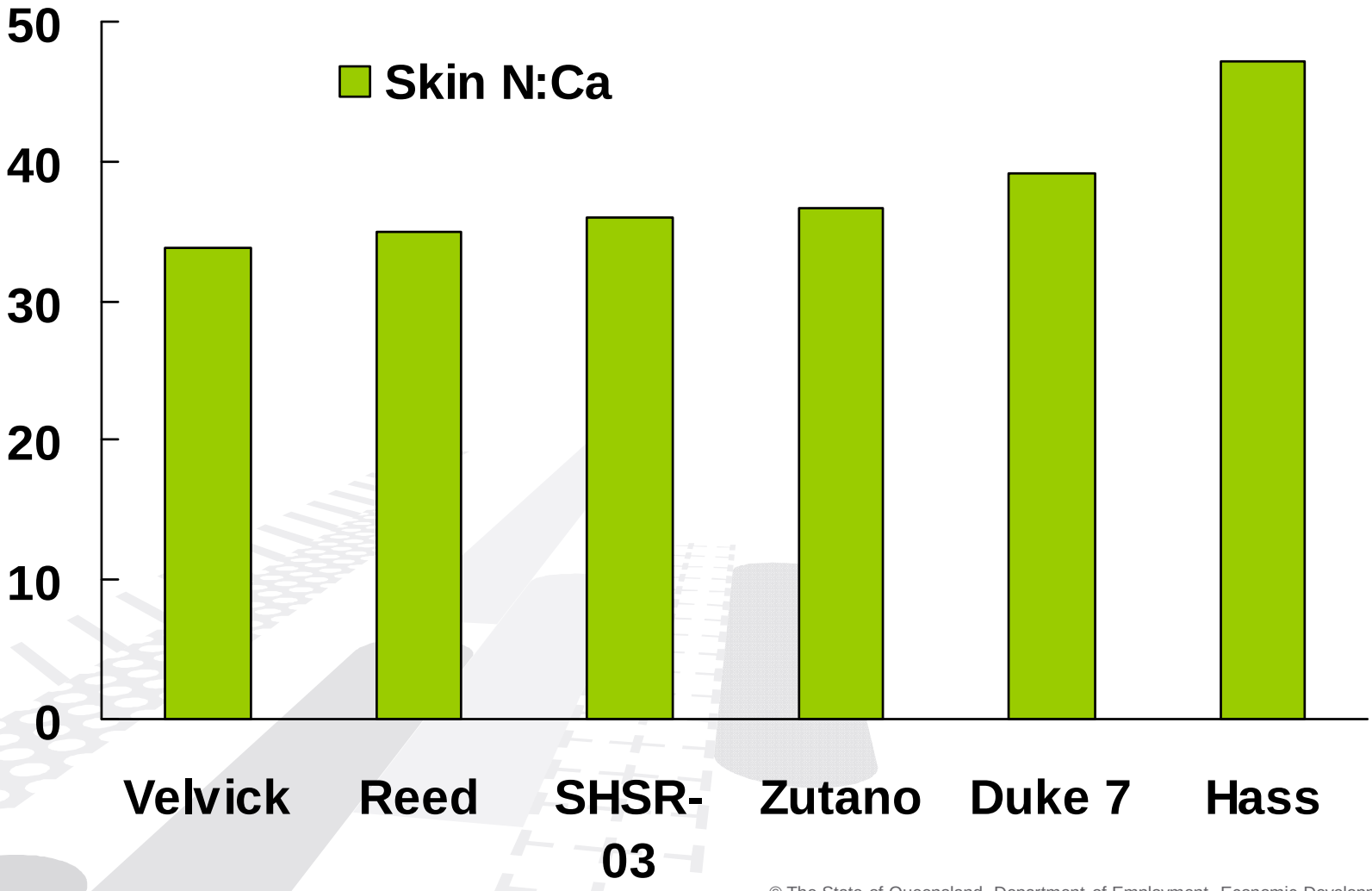
Rootstock affects postharvest disease

- Fruit harvested from T. Whiley's rootstock trials at
  - Childers, QLD ('Hass' in 2008 and 2009)
  - Walkamin, QLD ('Shepard' in 2009)
  - Pemberton, WA ('Hass' in 2008)
  - Hampton, QLD ('Hass' in 2007 and 2008)
- Ripened at 23°C & 65% RH (Indooroopilly)
- Stored 5 weeks at 5.5°C, then ripened 20°C (Maroochy)
- Assessed for postharvest disease

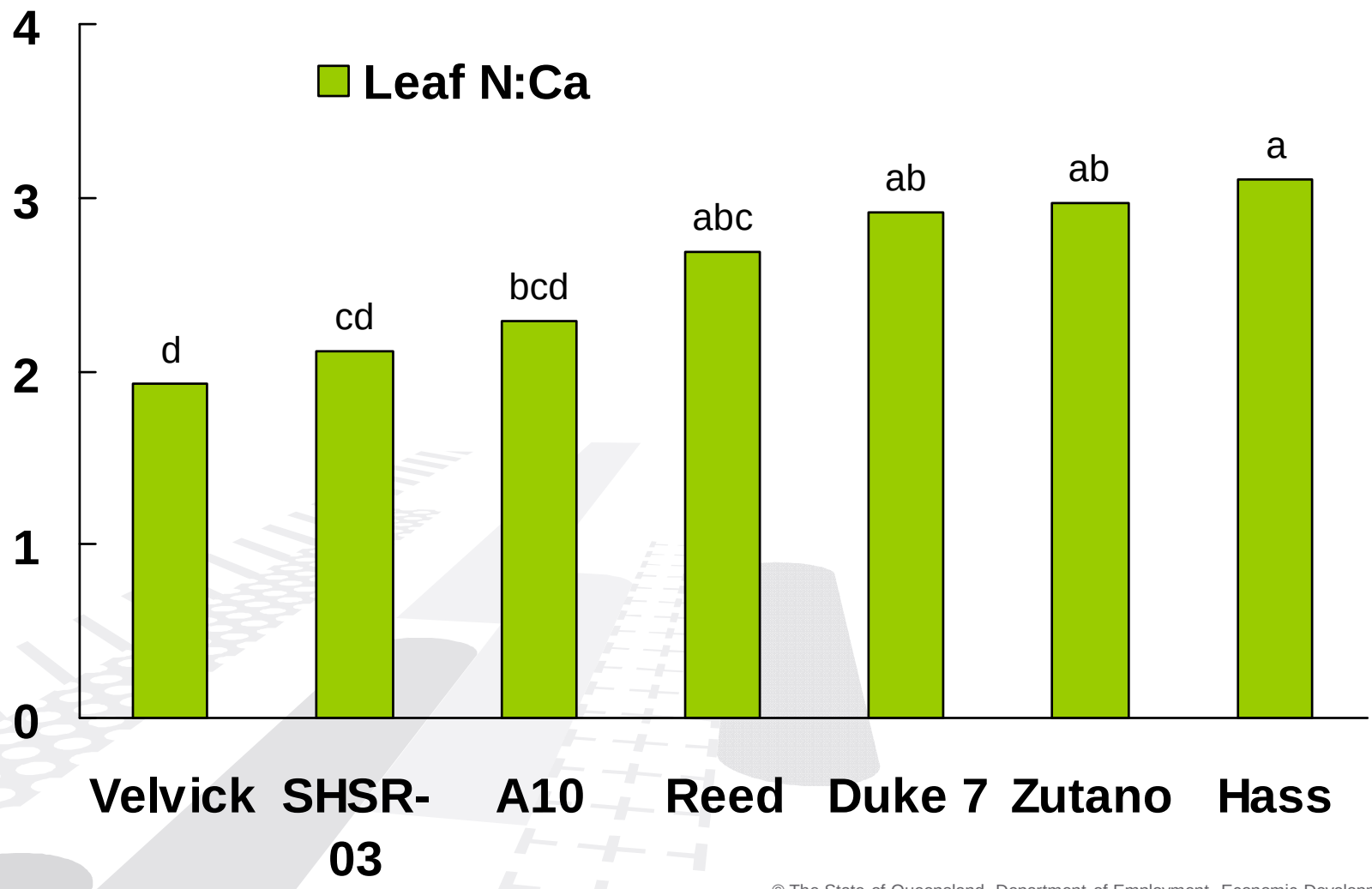
Effect of rootstock on anthracnose, Hampton 2008



Effect of rootstock on fruit skin N:Ca ratio, Hampton 2008



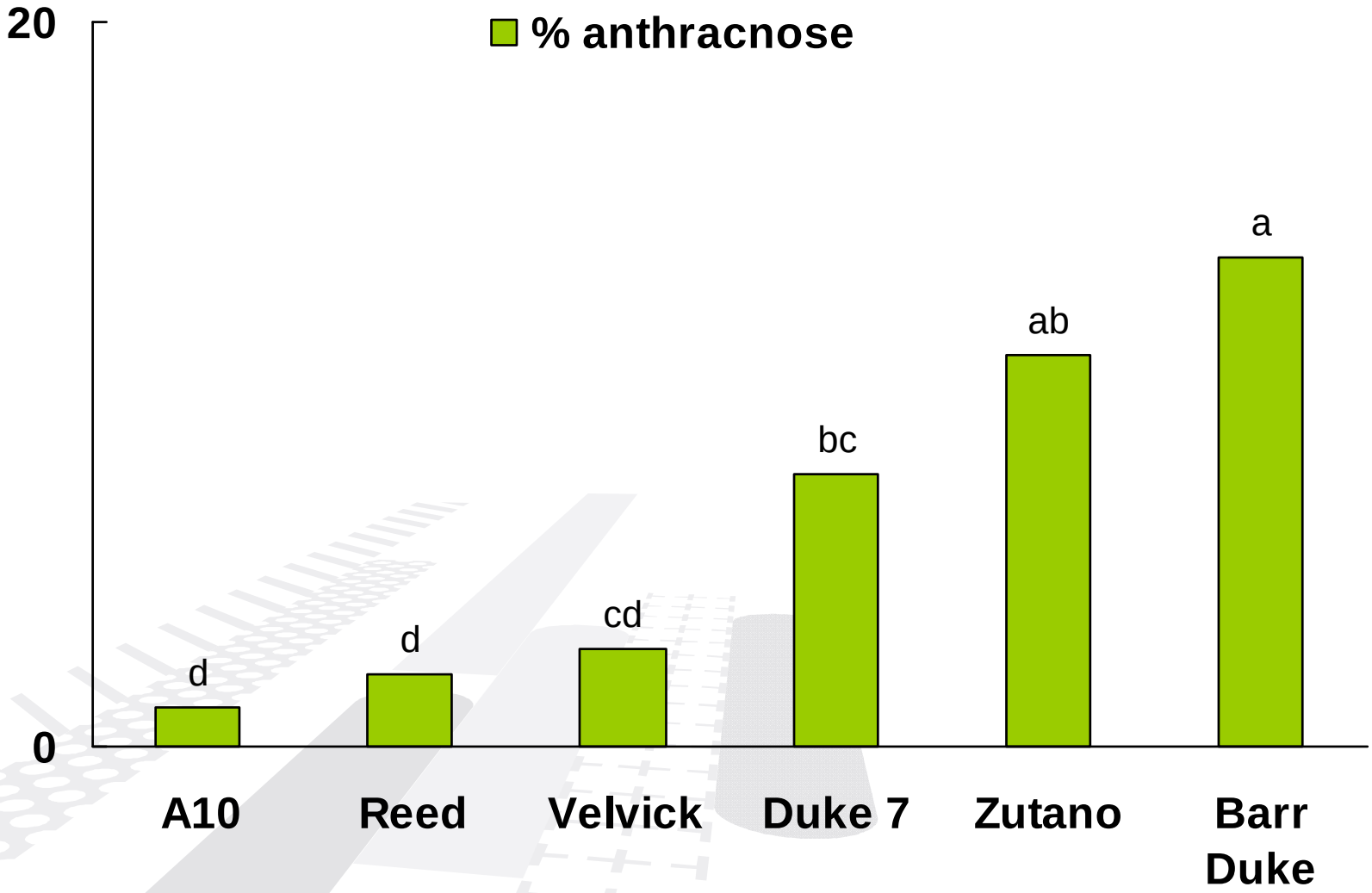
Effect of rootstock on leaf N:Ca ratio, Hampton 2009



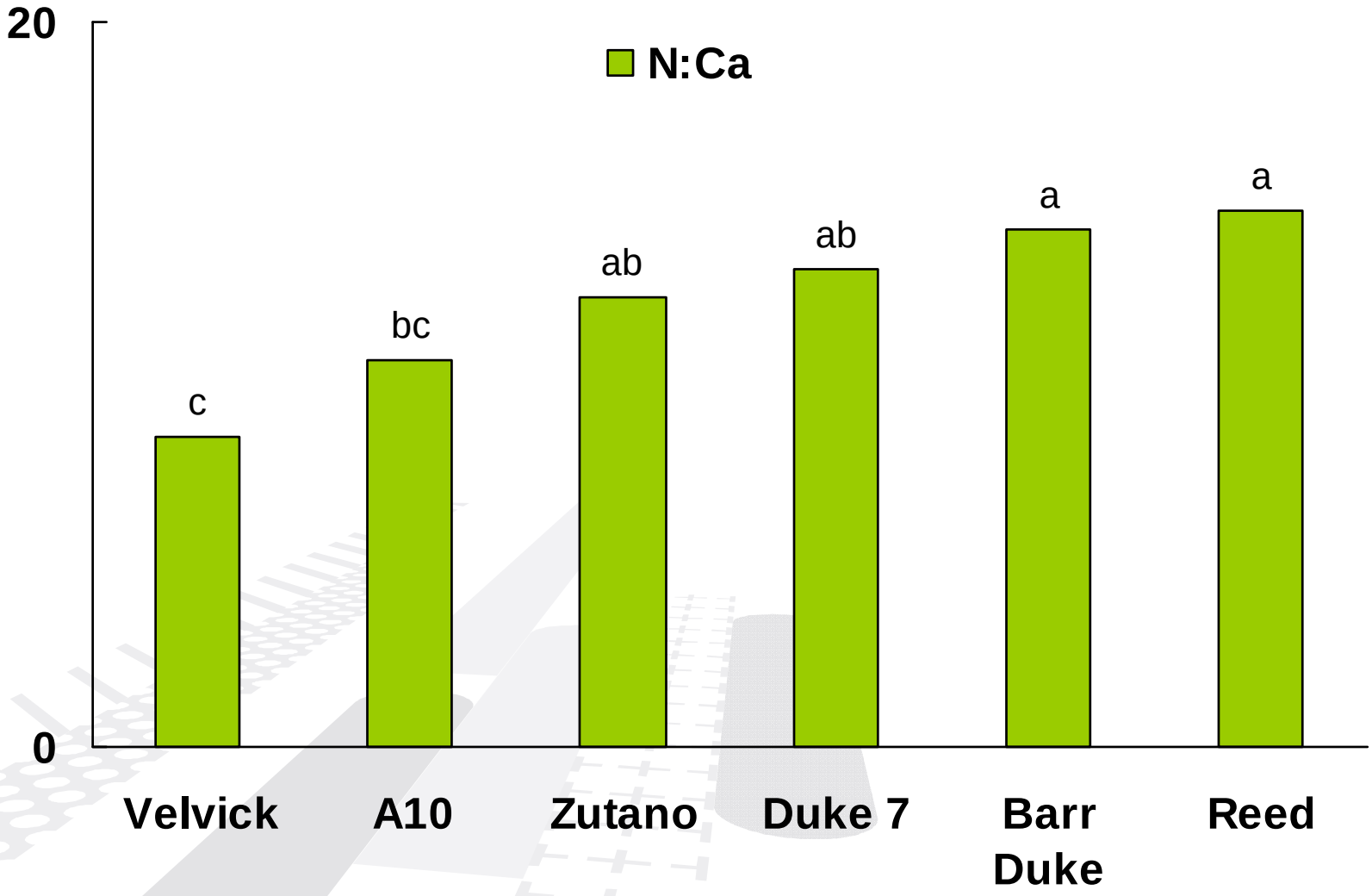
Correlations between disease, yield & nutrient balance – Hampton 2008

Variable 1	Variable 2	P	r (correlation coefficient)	Relationship
Anthracnose severity	Yield per tree	0.044	0.30	-
Anthracnose severity	Fruit skin N:Ca	0.011	0.39	+
Stem-end rot severity	Fruit skin N:Ca	0.013	0.38	+

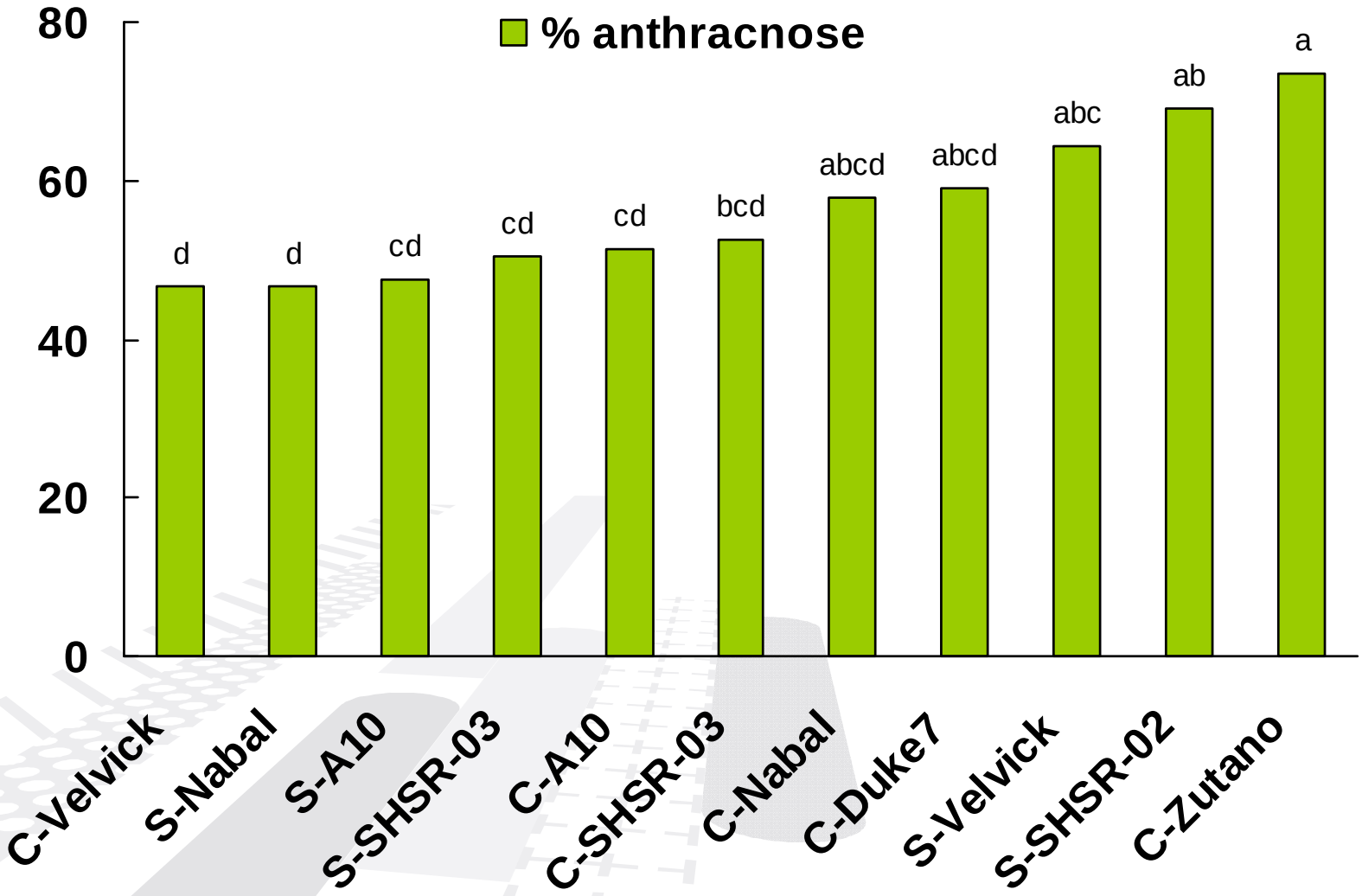
Effect of rootstock on anthracnose, Pemberton 2008



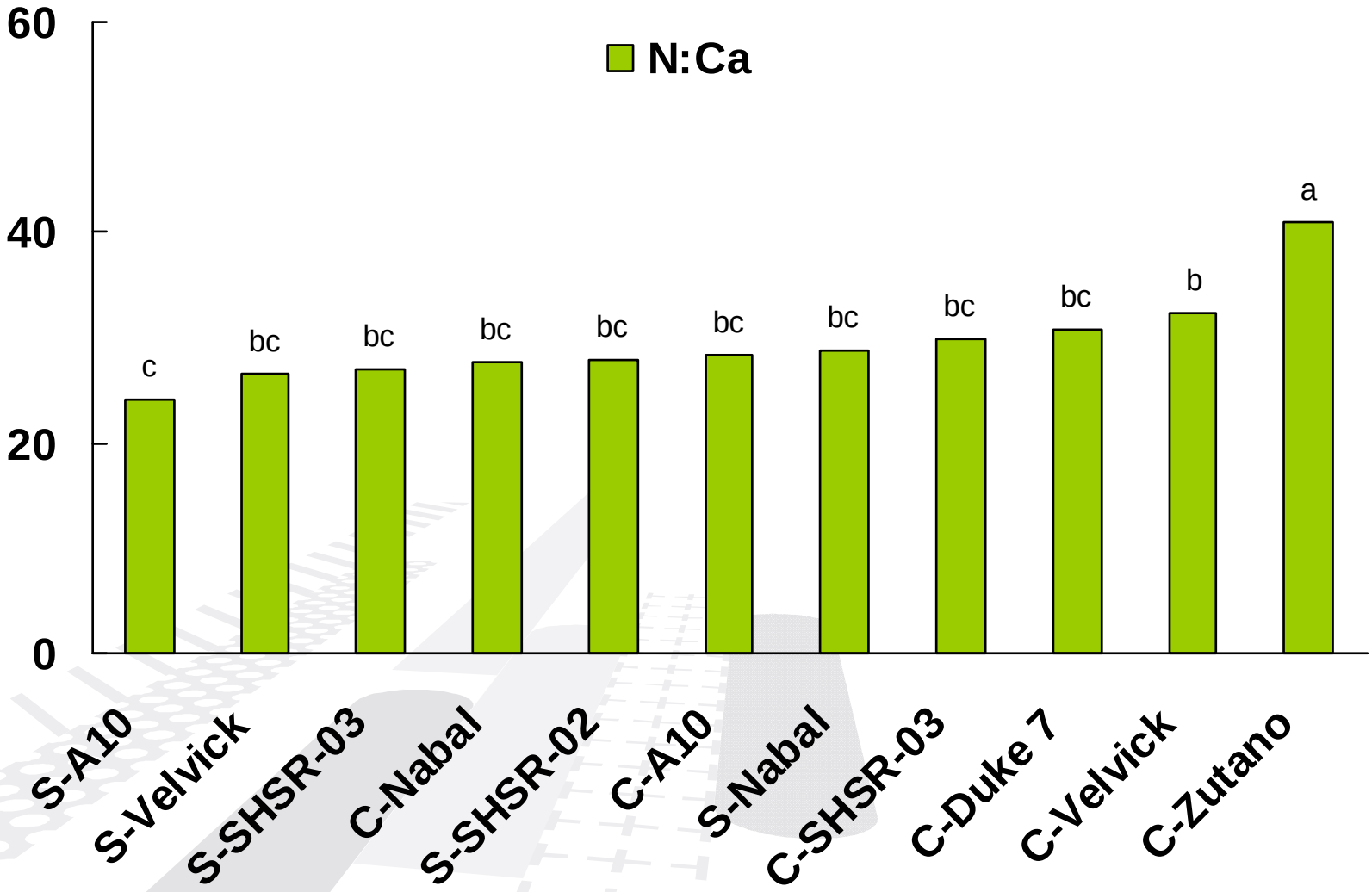
Effect of rootstock on fruit skin N:Ca ratio, Pemberton 2008



Effect of rootstock on anthracnose, Childers 2009



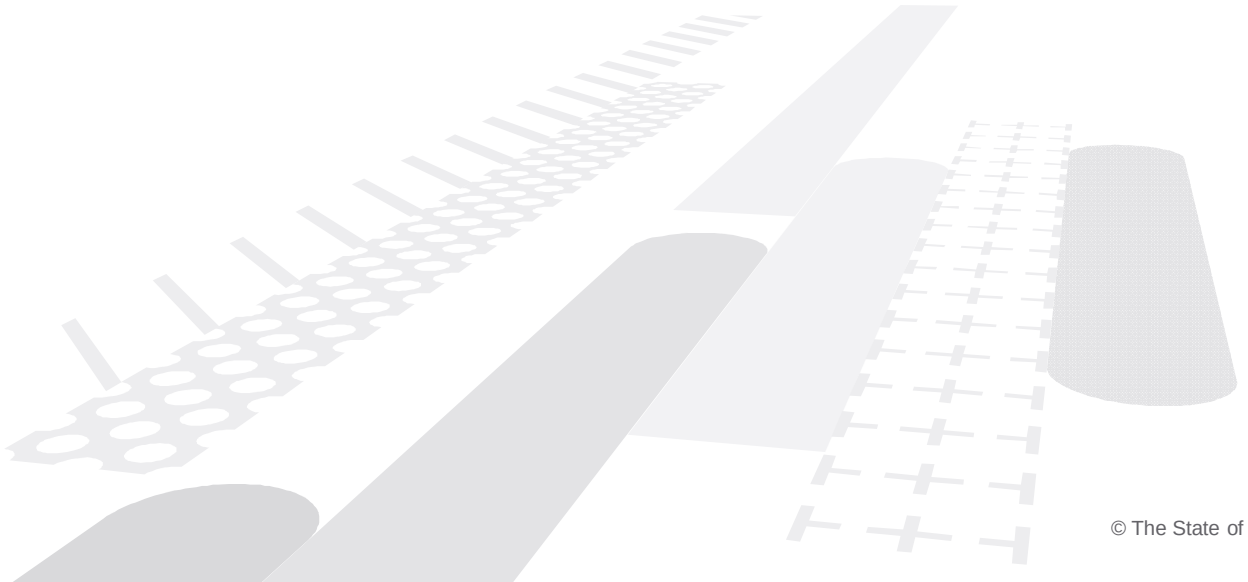
Effect of rootstock on N:Ca ratio, Childers 2009



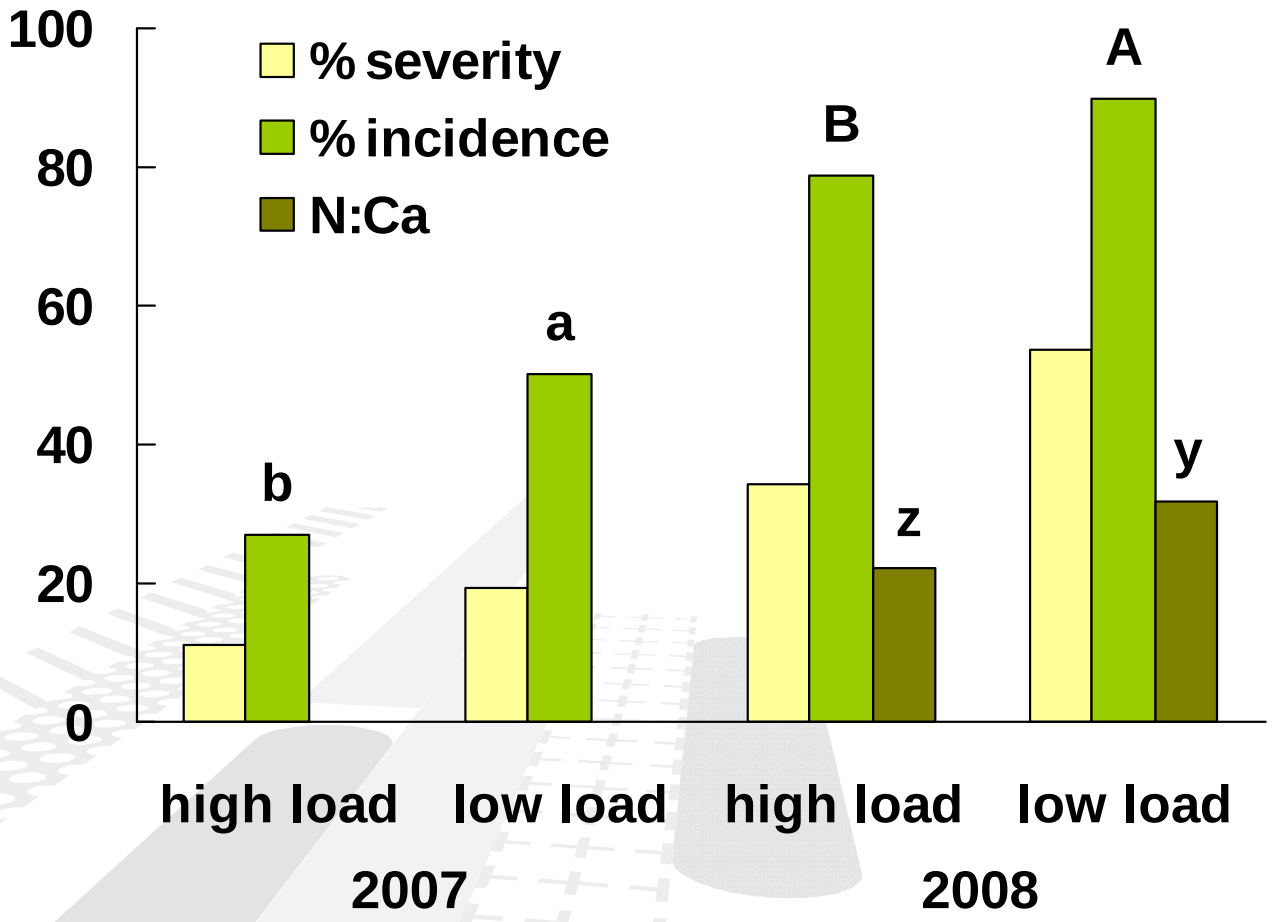
Significant trends

- **Rootstock affects fruit quality**
  - All locations
- **yield ↓ as anthracnose severity ↑**
  - Childers and Hampton 2008
- **anthracnose severity ↑ as N and/or N:Ca ↑**
  - All locations

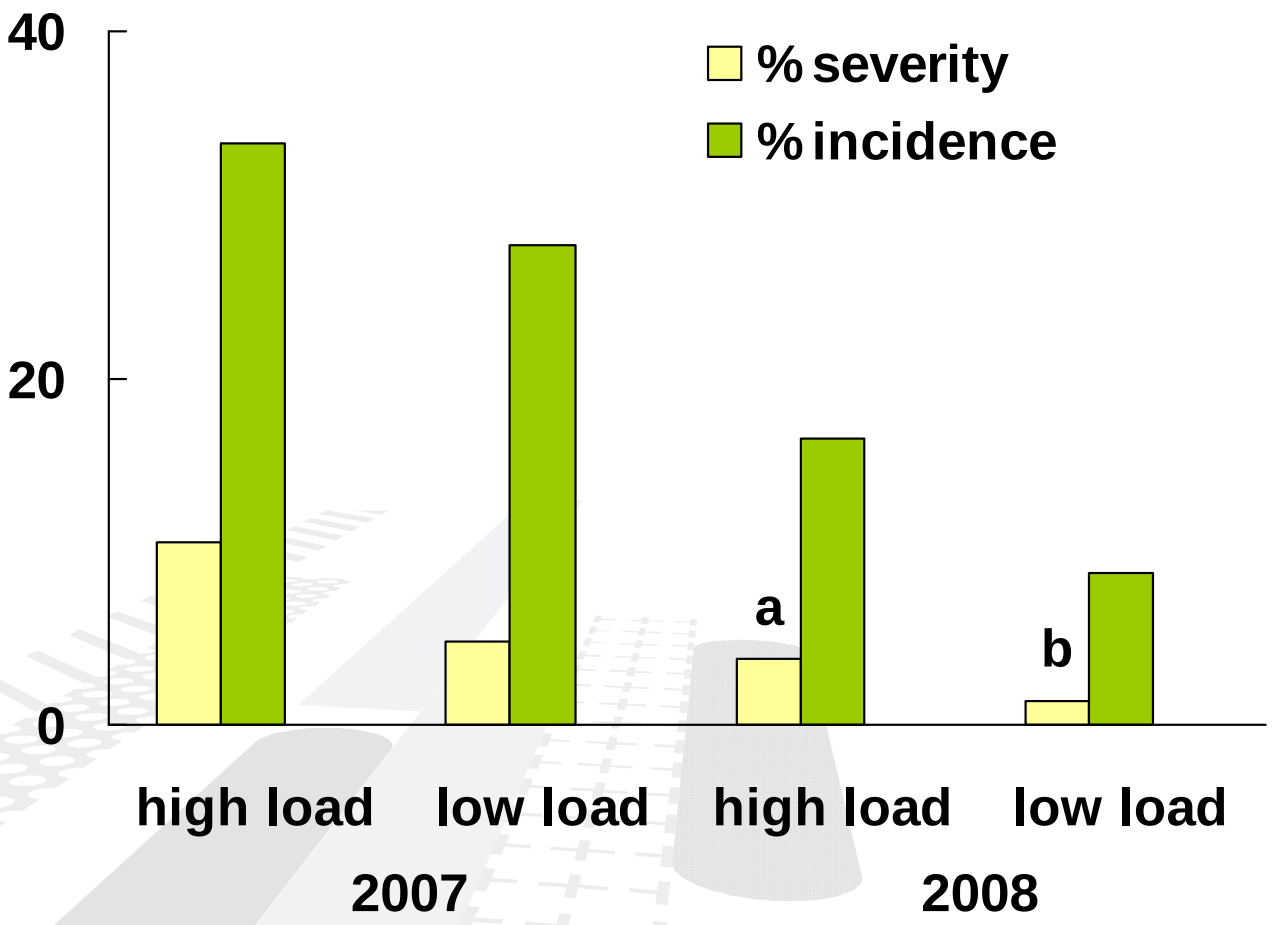
Effect of crop load on fruit quality



Effect of crop load on anthracnose disease



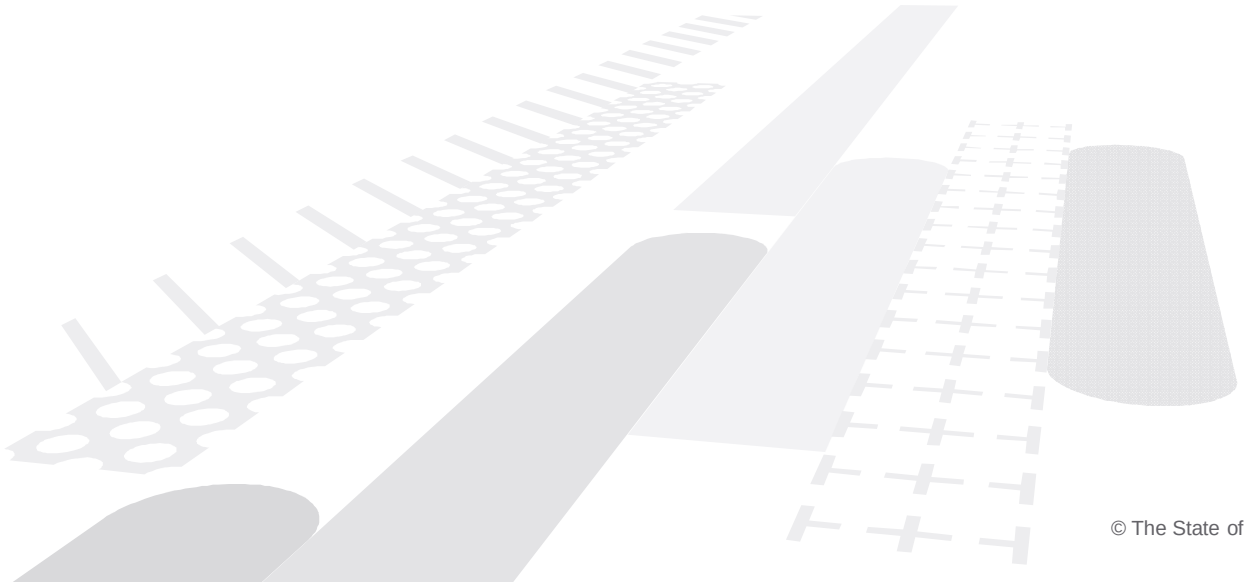
Effect of crop load on stem-end rot disease



Crop load affects quality

- ↓ anthracnose & ↓ N:Ca with ↑ crop load
- But, ↑ stem-end rot with ↑ crop load
  - Stem-end rot more severe when trees are stressed
  - Optimum irrigation and nutrition critical for control

Using fungicides to improve fruit quality

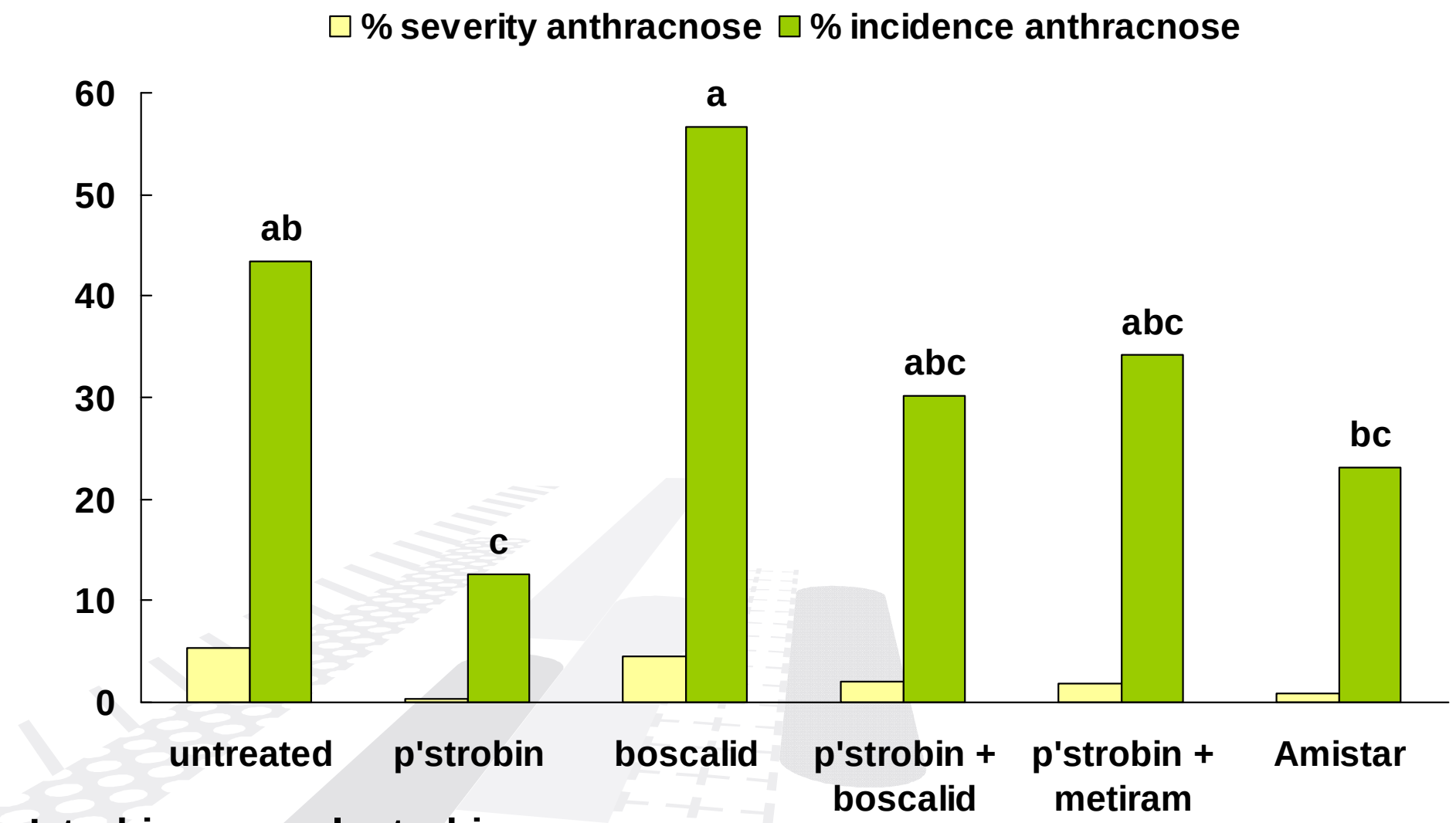


Assessment of new strobilurin products

- Initially a product screening trial (2008)
  - pyraclostrobin – Group 11 (previously Group K)
  - metiram – zinc based protectant fungicide
  - boscalid – locally systemic f'cide with wide activity
  - pyraclostrobin + boscalid
  - pyraclostrobin + metiram

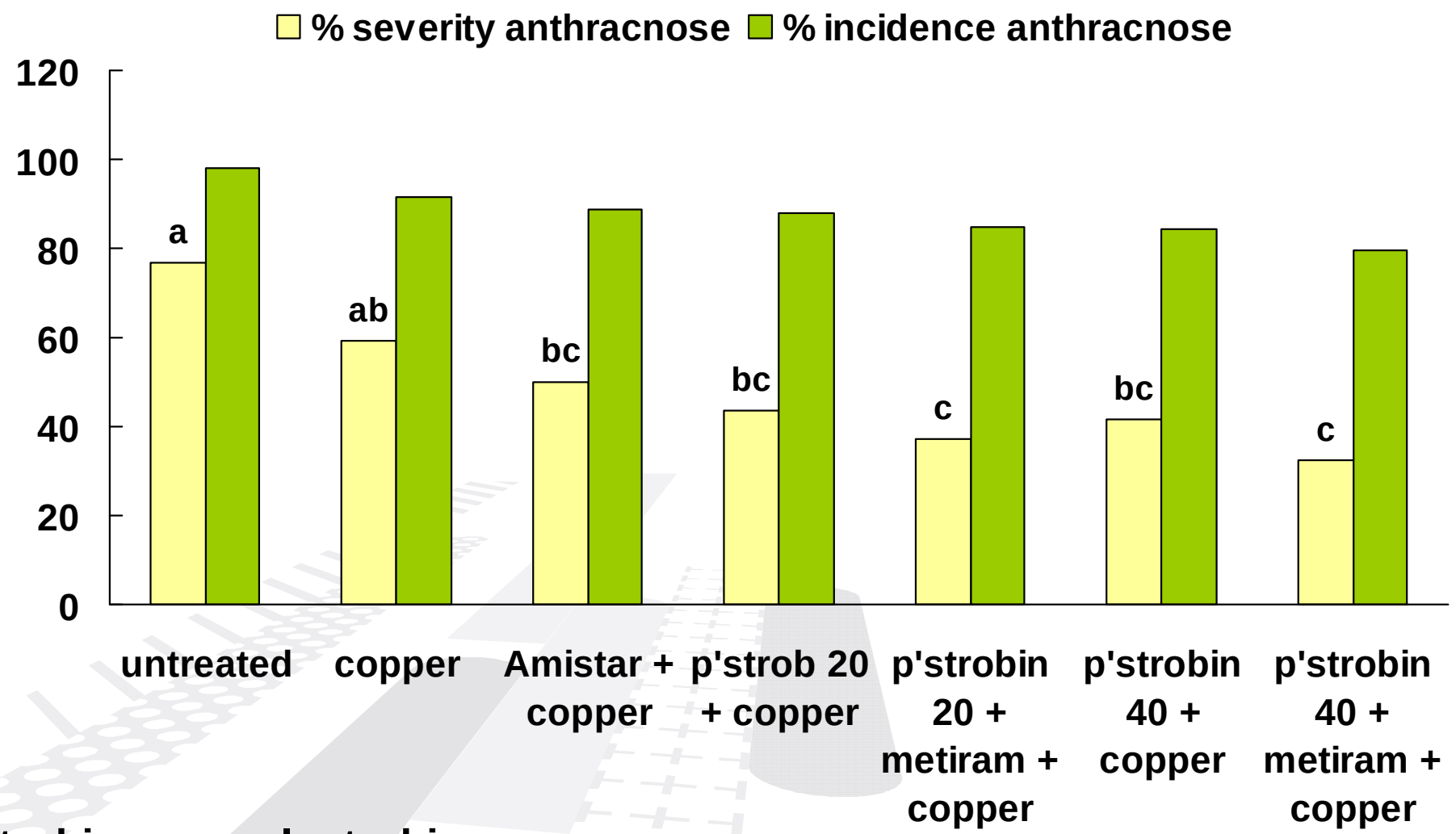
- Then as part of an anti-resistance program (2009)
  - Pyraclostrobin ± metiram

Product screening trial, Duranbah 2008 (cv. Reed)



p'strobin = pyraclostrobin

Anti-resistance trial, Glasshouse Mtns 2009 (cv. Hass)

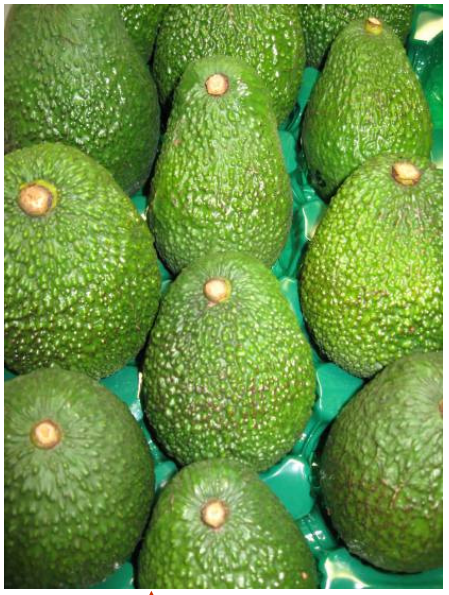


p'strobin = pyraclostrobin

Most effective and responsible use of fungicides

- ***Always follow label directions***
- Protectants – no “short-cuts” in copper spray program (every 28 days in fine weather, every 14 days if wet)
- Strobilurins – only Amistar® registered in avocado
  - post-infection activity
  - use with copper sprays in an anti-resistance strategy
  - effective when applied close to harvest and after extended periods of wet weather
- Postharvest – apply prochloraz within 24h after harvest
  - use in conjunction with field spray program
  - can’t be used on fruit destined for Europe

Integrated control – the complete picture



Tree husbandry

- nutrition (N, Ca)
- canopy mgt
- mulching
- root health
- irrigation

Strategic fungicides

- protectants and post-infection
- phosphorus acid
- postharvest

Careful harvest

- maturity %DM
- wet weather

Postharvest care

- cool chain
- pre-condition
- CA, ethylene

Acknowledgements

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Avocados Australia

Nufarm

HAL

Know-how for Horticulture™

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