Effect of crop load on ‘Cripps’ Pink’ fruit quality

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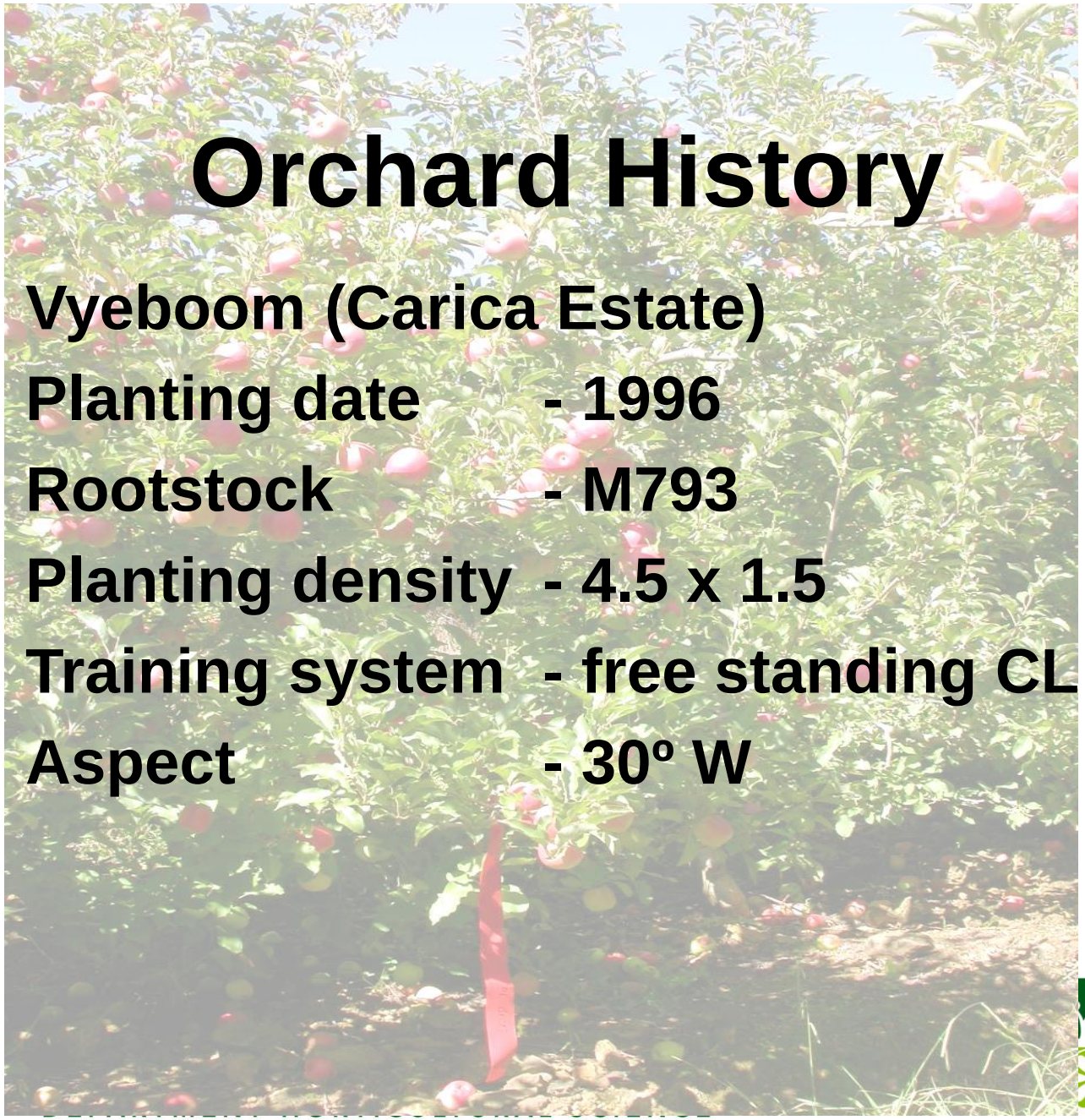
MOTIVATION

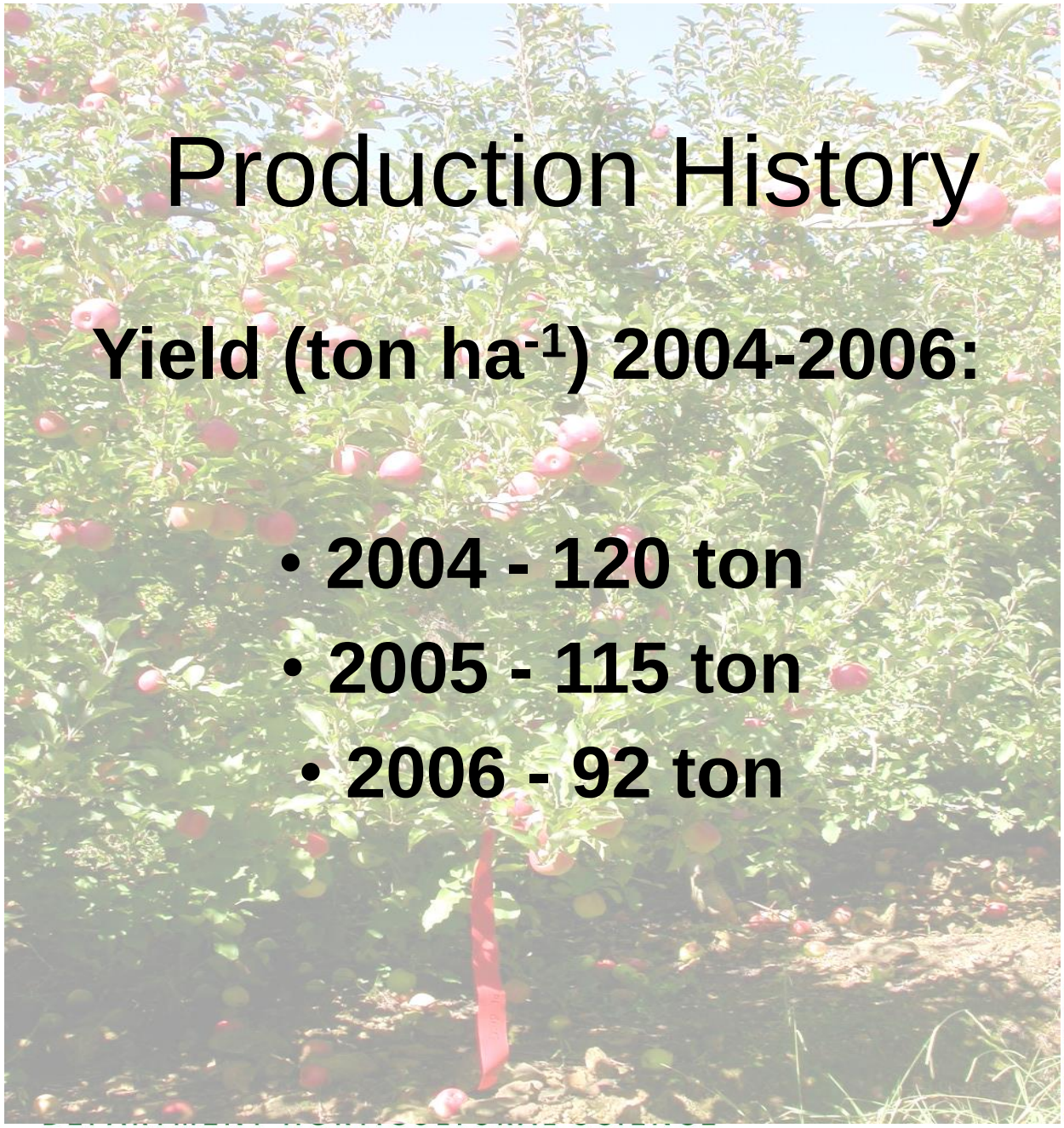
Determine the effect of crop load on:

1) ‘Cripps’ Pink’ fruit quality
2) Profitability (Class 1 tons)
3) Return bloom
4) Storability

Orchard History

- Vyeboom (Carica Estate)
- Planting date - 1996
- Rootstock - M793
- Planting density - 4.5 x 1.5
- Training system - free standing CL
- Aspect - 30º W





Production History

Yield (ton ha^{-1}) 2004-2006:

- **2004 - 120 ton**
- **2005 - 115 ton**
- **2006 - 92 ton**

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Trial Layout

- 5 Treatments in 12 blocks (single tree/plot)
  1) Control - commercial thinning (2/3 fruits per cluster)
  2) Single fruit per cluster (bottom 1.8m of tree)
  3) Single fruit per cluster (whole tree)
  4) Single fruit & small/blemished fruit removed
  5) Single fruit & small/blemished/inside fruit removed

- Full bloom date – 11 Oct 07
- Treatment date – 29 Nov 07

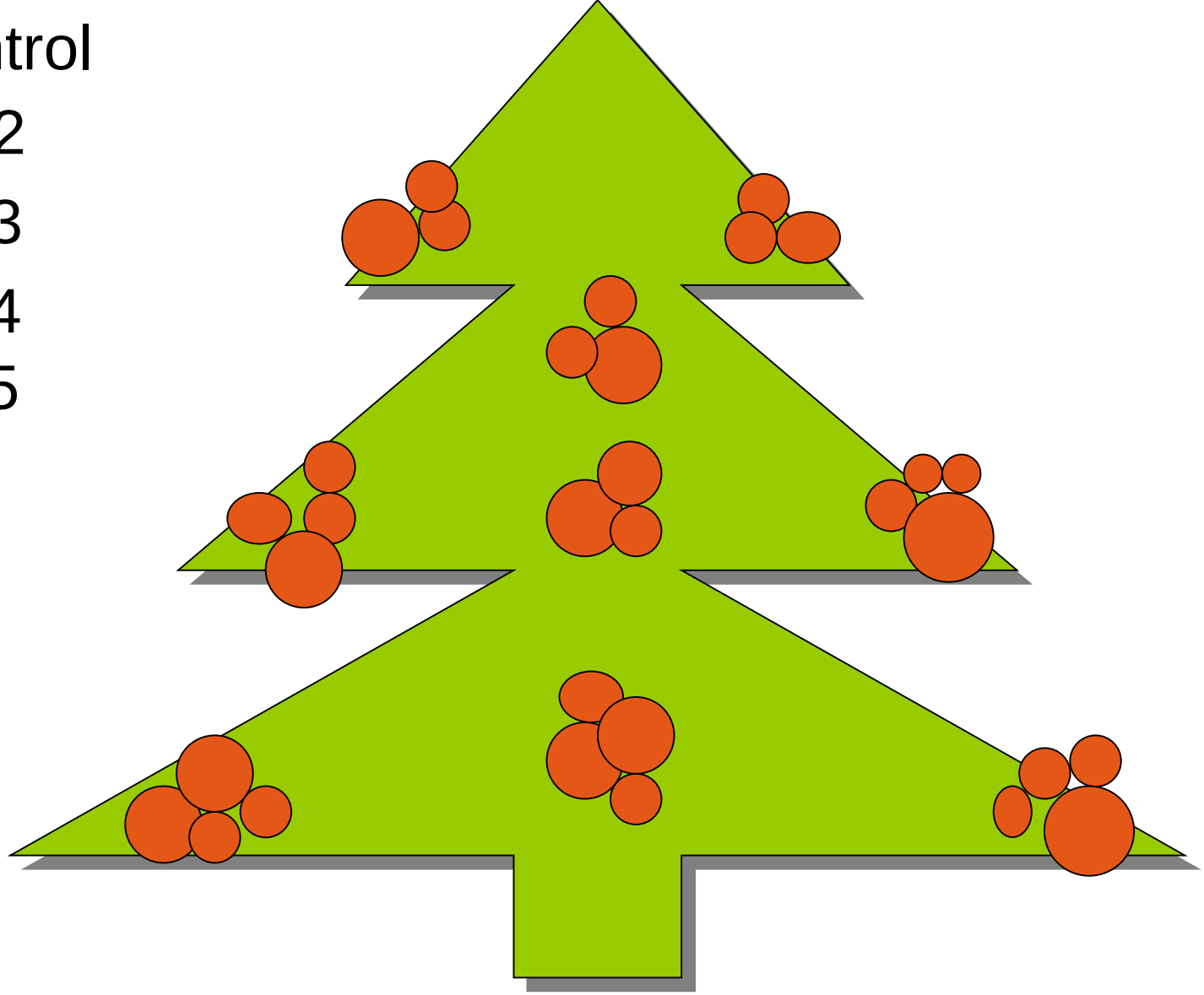
Control

Trt 2

Trt 3

Trt 4

Trt 5



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Data collection

- Three harvest dates
  - 18 April, 2 May, 7 May
- 25 fruit sample per tree per harvest date
  - Colour
  - Maturity (TSS, firmness, starch conversion)
  - Quality (Sunburn, colour grade, size)
- Rest of the fruit
  - Sample graded per treatment to establish sampling accuracy

Sample grader bins

Results & Discussion

Effect on yield and fruit size

Treatment	Number of thinned fruit	Estimated fruit number	Total yield (ton ha^{-1})	Av. fruit mass (g)	Av. fruit diameter (mm)
Control	0 e	695 a	137 ab	135 b	66.8 c
Single - <1.8m	67 d	712 a	139 a	138 b	67.2 bc
Single - whole tree	156 c	582 b	120 b	140 b	67.9 b
Single and small	236 b	587 b	126 ab	146 a	69.1 a
Single, small and inside	321 a	451 c	99 c	148 a	69.3 a
			Pr>F		
Trunk circ	<.0001	<.0001	<.0001	0.0177	0.0032
Treatment	<.0001	<.0001	0.0004	<.0001	<.0001
Crop load lin	<.0001	<.0001	<.0001	<.0001	<.0001
Crop load quad	0.0065	0.7157	0.474	0.5249	0.2166

Fruit Size

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Effect on fruit maturity and internal quality

Treatment	Harvest distribution	Firmness (kg)	TSS (° brix)	Acidity	TSS/Acidity
Control	1.784 a	8.3 bc	13.9 b	0.51 c	27.5 a
Single - <1.8m	1.664 ab	8.5 ab	14.1 b	0.53 bc	26.8 ab
Single - whole tree	1.657 b	8.4 bc	14.2 b	0.55 b	26.0 bc
Single and small	1.63 b	8.2 c	14.1 b	0.53 bc	26.6 ab
Single, small and inside	1.48 c	8.6 a	14.7 a	0.58 a	25.3 c
		Pr>F			
Trunk circ	0.0147	0.0027	0.0200	0.0354	-
Treatment	0.0005	0.0012	0.0014	<.0001	0.0042
Crop load lin	<.0001	0.0074	<.0001	<.0001	0.0001
Crop load quad	0.9807	0.0562	0.2837	0.6508	0.6672

Effect on cull factors and Class 1%

Treatment	% poor red	% sunburn	% undersize fruit	Class 1%
Control	25	18	0.7	56
Single - <1.8m	20	20	0.6	61
Single - whole tree	23	16	0.1	61
Single and small	24	16	0.2	61
Single, small and inside	18	21	0.2	62
		Pr>F		
Treatment	0.1279	0.3165	0.0746	0.6132
Crop load lin	0.0651	0.5821	0.0216	0.2065
Crop load quad	0.4855	0.0914	0.0981	0.3969

Poor red colour

Fruit quality – Sample accuracy

TRT	Class 1%		Sunburn %		% poor red		Undersize	
	Sample	TAD	Sample	TAD	Sample	TAD	Sample	TAD
Control	56	60	18	6	25	32	0.7	5
Single <1.8m	61	64	20	5	20	28	0.6	4
Single	61	65	16	6	23	28	0.1	2
+ small	61	60	16	6	24	35	0.2	2
+ inside	62	70	21	9	18	20	0.2	2

Fruit quality – Sample accuracy

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	Sample	TAD	Sample	TAD	Sample	TAD	Sample	TAD
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Single <1.8m	61	64	20	5	20	28	0.6	4
Single	61	65	16	6	23	28	0.1	2
+ small	61	60	16	6	24	35	0.2	2
+ inside	62	70	21	9	18	20	0.2	2

Effect of crop load on colour.

Treatment	Lightness	Chroma	Hue (º)
Control	49.0	43.2 c	34.0
Single - <1.8m	48.5	43.1 c	32.8
Single - whole tree	48.7	43.7 bc	33.0
Single and small	49.1	43.9 b	32.8
Single, small and inside	47.9	45.0 a	31.5
	Pr>F		
Trunk circ.	0.0376	0.0052	0.0004
Treatment	0.0973	<.0001	0.1815
Crop load linear	0.0333	<.0001	0.0234
Crop load quadratic	0.2470	0.2070	0.9617

Yield (ton ha^{-1}) statistics according to TAD grading.

TRT	**Class1**	Class 2	Class 3	Total yield
Control	**83** (60)	43	12	138
Single <1.8m	**89** (64)	39	11	139
Single	**78** (65)	36	7	121
+ small	**76** (60)	45	5	126
+ inside	**70** (70)	25	4	99

Summary

Lower crop load

- Larger fruit
- Advanced maturity
- Better internal quality?
- Higher % first class fruit due to better colour

HOWEVER

Lower crop load

- Fewer export cartons

2007/2008 SEASON

- Repetition of trial using same trees as in previous season.
- Conduct economic analysis
- Assess:
  - storability and shelf life
  - consumer preference (maybe)
  - reserve status in autumn
  - vegetative growth

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