



Future Orchards 2012

Crop Loading

Presented by

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AGFIRST

Nov 2007

Crop Load Has Major Influence Crop Out Turn

	High Crop Load	Low Crop Load
Determines Yield	↑	↓
Fruit Size	↓	↑
Fruit Quality		
• Soluble Solids	↓	↑
• Fruit Pressure	↓	↑
• Colour	↓	↑
• Harvest Window	Delayed	Advanced
• Storage Potential	↑	↓

What is the Optimum Crop Load?

Determined by:

Tree Size

- Measured by Trunk Cross Sectional Area (TCA)
- Or Canopy Volume (TRV)

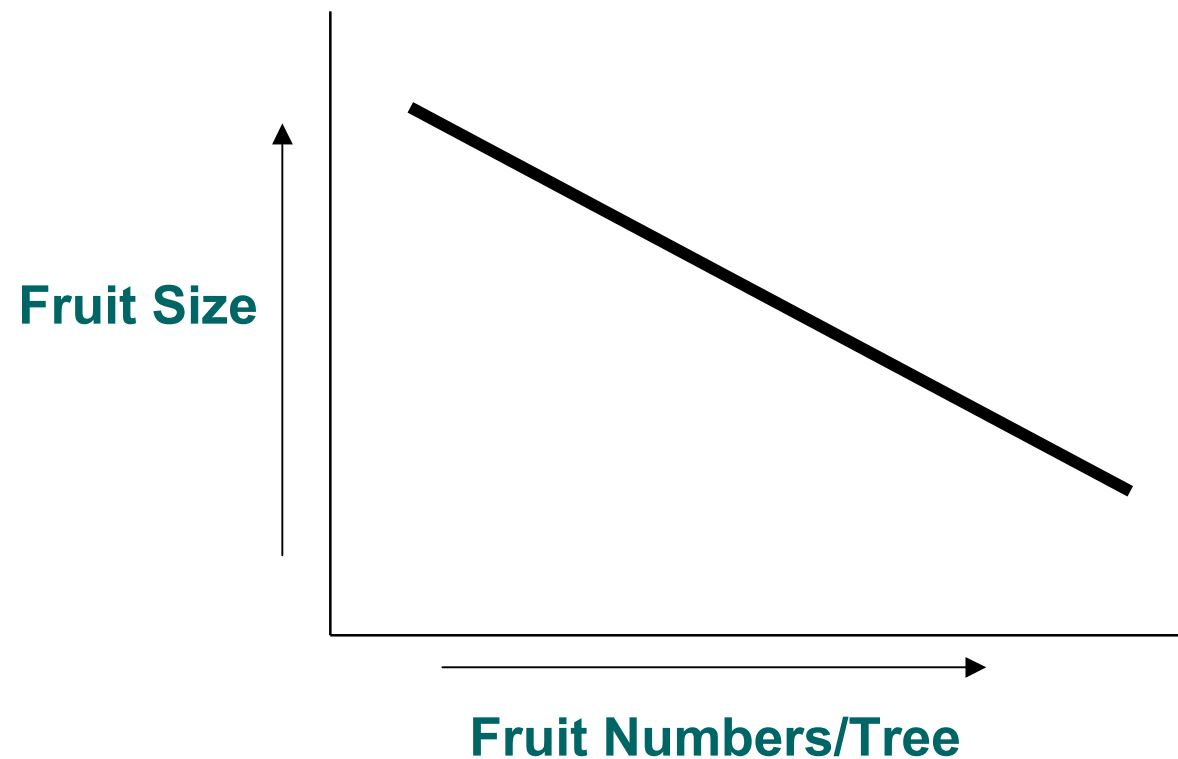
Market Requirement

- Fruit Size Range
- Selling Season
- Fruit Colour

Limited by

- Seasonal Weather Conditions
 - Orchard Site Soil and Microclimate
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Effect of Crop Load on Fruit Size



Growing Conditions

	Fruit Sizing
Cool Spring	↓
Warm Spring	↑
Excess Summer Heat	↓
Water Stress	↓

Measure fruitlet growth

Adjust crop load to suit conditions

How to set optimum crop load

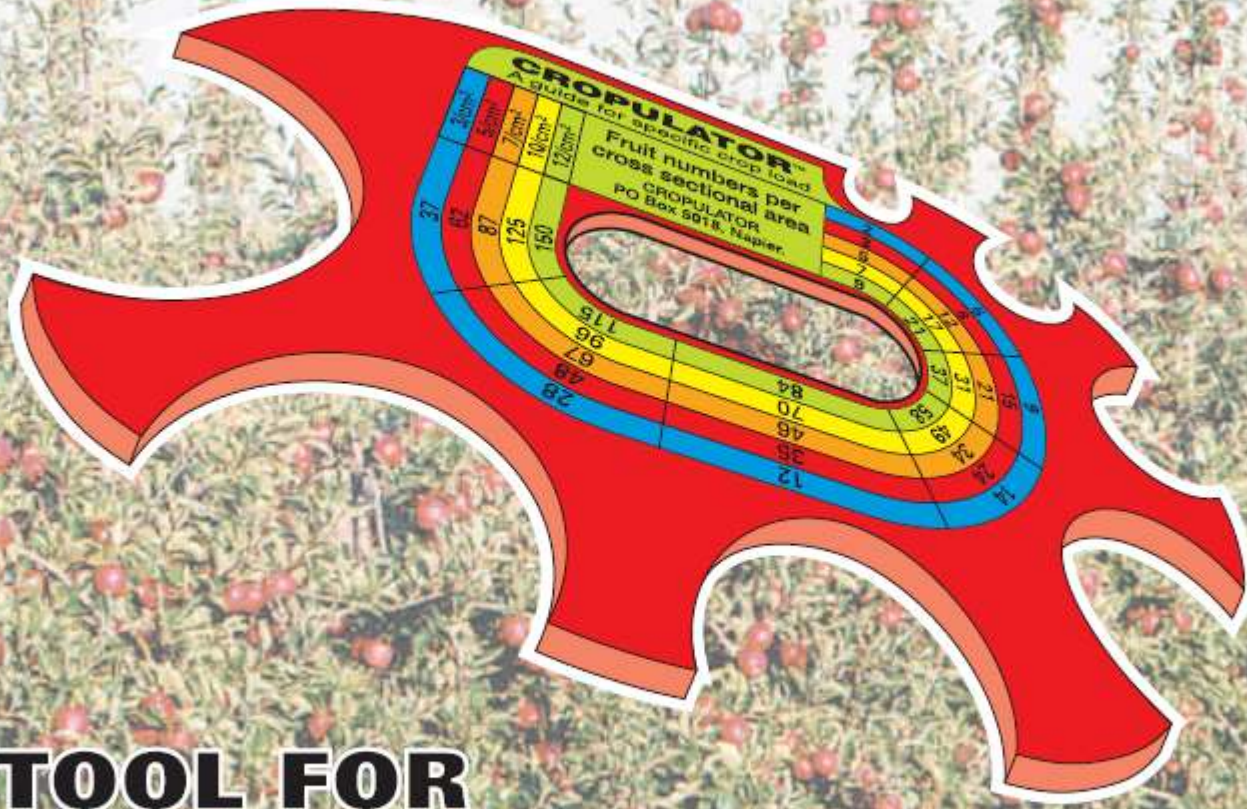
- Young Developing blocks use Trunk Cross Sectional Area (TCA).
 - Mature Blocks use historical performance
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CROP LOADING CALCULATOR BASED ON TRUNK CROSS SECTIONAL AREA

Joe Bloggs

Block Name	Jazz	Royal Gala	Fuji	
Tree No	Trunk diameter (mm)	Trunk diameter (mm)	Trunk diameter (mm)	Trunk diameter (mm)
1	25	35	50	
2	23	34	55	
3	26	38	65	
4	24	39	75	
5	25	40	65	
6	26	33	68	
7	28	36	65	
8	30	33	63	
9	32	45	70	
10	32	36	72	
Average (mm)	27	37	65	0
TCA (cm ²)	5.8	10.7	33.0	0.0
<i>Crop Target</i>	5	53	165	0
	7	75	231	0
	10	107	330	0
Specific Target	8.5	91	280	0

CROPULATOR™



A TOOL FOR PRECISION CROP LOADING



MADE IN NEW ZEALAND

CROPULATOR™ PO Box 5018, Napier NZ Nov/2006

Historical Yield Performance

Mr Bloggs Royal Gala History

Year	Harvested Yield (kg/ha)	Average Fruit Size
2005	50000	105
2006	80000	135
2007	65000	110



Historical Yield Performance

Crop Load Calculator Kgs/Ha

Orchard Name	Joe Bloggs		
Block	Row Space	Tree Space	Tree No /ha
	5.0	3.0	667
Harvest target (kg/ha)	65000		
Fruit Size target (avg fruit no/tce)	110		
Average fruit weight (gms)	169		
Estimate loss from thinning to harvest	10%		
Fruit No at Thinning	634		

Well Thinned Fuji



Lifting Crop Load Potential



Selective Thinning

- By fruitlet size
- By wood type
- By spur leaf area

For Biennial Varieties

- Thin to 2's to increase number of vacant fruiting sites

Explore Effect Of Crop Load By:

- Setting up trees with different crops
 - Check fruit size and fruit quality near harvest from trees with differing crop loads
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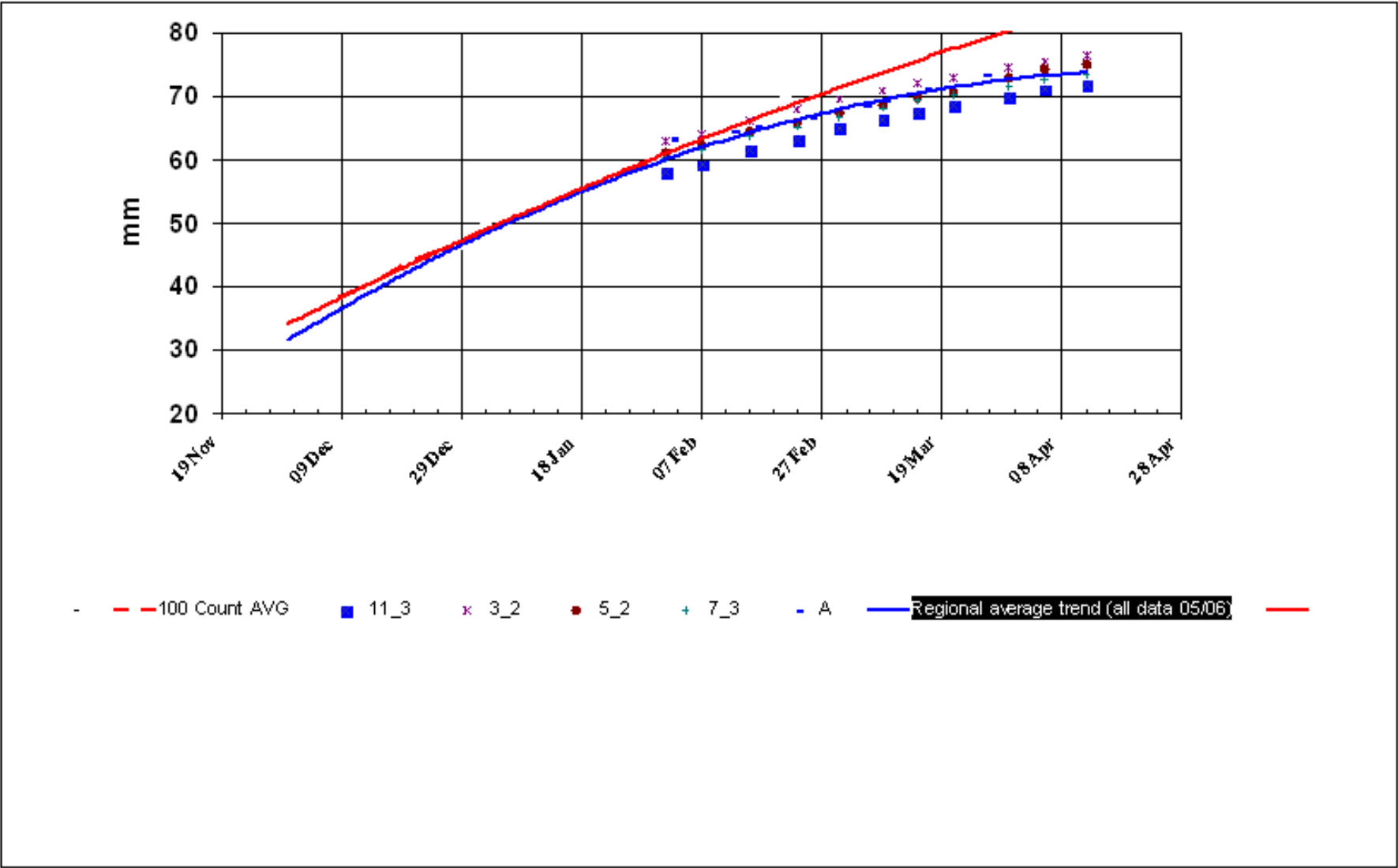
Fruit Size Measuring Data

Group Report for Adelaide

05/11/2007

Note: The long term trend line is based on historical averages and the regional trend line for the current season is based on the data surveyed to date by Agfirst in the district. The computer model forecasts the trend line based on the data collected at the time of printing.

Pink Lady



2006-07 Crop loading trial results



Address Coldstore Rd Lenswood
 Variety x Rootstock Combination Rosy Glow x M.9
 Planting Date 2001
 Planting density 2857 trees/ha (3.5m x 1m)

Crop load Objectives

Treatment 1	Normal thin	
Treatment 2	50 t/ha	96 fruit/tree
Treatment 3	60 t/ha	116 fruit/tree
Treatment 4	70 t/ha	135 fruit/tree

Thinning & Yield Results (average 5 tree plots)

Treatment	Target fruit no	Fruit no Pre thinning	Fruit no after thinning	1 st pick	2 nd pick	Total Fruit no harvested	% 1 st pick	Ave fruit size
Normal thin	?	156	117	131	11	142	92	183.4
50 t/ha	96	198	96	113	13	126	90	171.7
60 t/ha	116	156	116	113	11	124	91	176.5
70 t/ha	135	198	135	132	32	164	80	174.2

Treatment	Total yield t/ha	% cull fruit	Marketable yield T/ha	Income lost - culls @\$1350/t	% Singles	% Doubles	% Triples
Normal thin	65.9	4	63.3	\$3471	50 / 48 / 2		
50 t/ha	53.3	5	50.7	\$3394	62 / 32 / 6		
60 t/ha	58.0	4	56.6	\$1851	48 / 42 / 10		
70 t/ha	84.6	3	82.9	\$2314	44 / 47 / 9		

Fruit Maturity Indicators

Treatment	Ave fruit wt (gms)	Fruit Circum*	% colour	Starch	TSS	Pressure
Normal thin	185.4	73.4	91.2	3.2	13.9	9.4
50 t/ha	171.7	71.9	95.6	3.5	11.7	9.1
60 t/ha	176.5	72.6	84.8	3.1	14.1	9.3
70 t/ha	174.2	72.2	78.4	2.6	12.2	8.3

* circum = circumference

2006-07 Crop loading trial results



Address Cold Store Rd, Lenswood
 Variety x Rootstock Combination Rosy Glow x M.26
 Planting Date 2001
 Planting density 2857 trees/ha (3.5m x 1m)

Crop load Objectives

Treatment 1 Normal thin
 Treatment 2 50 t/ha 96 fruit/tree
 Treatment 3 60 t/ha 110 fruit/tree
 Treatment 4 70 t/ha 135 fruit/tree

Thinning & Yield Results (average 5 tree plots)

Treatment	Target fruit no	Fruit no Pre thinning	Fruit no after thinning	1 st pick	2 nd pick	Total Fruit no harvested	% 1 st pick	Ave fruit size (gms)
No thin (1 tree)		364	364		-	364	100	152
Normal thin	?	172	118	128	-	128	100	169
50 t/ha	96	185	96	107	-	107	100	177
60 t/ha	116	167	116	127	-	127	100	169
70 t/ha	135	200	135	145	-	145	100	176

Treatment	Total yield t/ha	% cull fruit	Marketable yield T/ha	Income lost - culls @\$1350/t
No thin	(137.1?)	20.6	(114.3?)	
Normal thin	58.2	4	56.7	\$2006
50 t/ha	50.0	2	49.4	\$836
60 t/ha	58.0	4	55.9	\$2777
70 t/ha	68.2	6	64.1	\$5477

% Singles	% Doubles	% Triples
98	2	0
96	4	0
80	18	0
52	38	10

Fruit Maturity/Quality Indicators

Treatment	Ave fruit wt (gms)	Fruit Circum*	% colour	Starch	TSS	Pressure
No thin	152					
Normal thin	169	71.3	89.6	2.4	14.5	9.6
50 t/ha	177	72.7	90.4	2.25	15.2	9.2
60 t/ha	169	71.9	85.8	2.1	14.8	9.1
70 t/ha	176	72.1	74.8	2.05	14.4	9.5

* circum = circumference