BAPL Grower Workshop

Pruning and Growing by Numbers

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20 January 2026 – Brook Farm, Wingham

Overview

- Why are BAPL running grower workshops?
  - *Ali Capper*
- Managing costs and improving returns
  - *Russell Graydon*
- Growing by numbers – why and how?
  - *Tom Hulme*
- Impact on tree structure decision making
  - *Tom Hulme and Russell Graydon*
- Open discussion

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Managing costs and improving returns

- What impacts on grower returns:

❖ Grower can influence

- Growing Costs
- Yield
- Size
- Gradeout

❖ Packer/marketer can influence

- Specifications
- SKU management
- Sales price

Managing costs and improving returns

- What impacts on grower returns:

❖ Grower can influence

	Rank
• Growing Costs	4
• Yield	3
• Size	2
• Gradeout	1

❖ Packer/marketer can influence

	Rank
• Specifications	3
• SKU management	2
• Sales price	1

Orchard Profit Sensitivity		
Category	Change	Change in Profit
Fertiliser & Crop Protection	-5%	+2%
Establishment	-5%	+3%
Labour - Husbandry	-5%	+4%
Labour - Harvest	-5%	+5%
Store/Grade/Pack/Market	-5%	+20%
Yield	+5%	+26%
Grade Out	+5%	+32%
Price	+5%	+54%

- Size influences SKU
- SKU influences sales basket price

- Growers need to know what size profile their marketing team require

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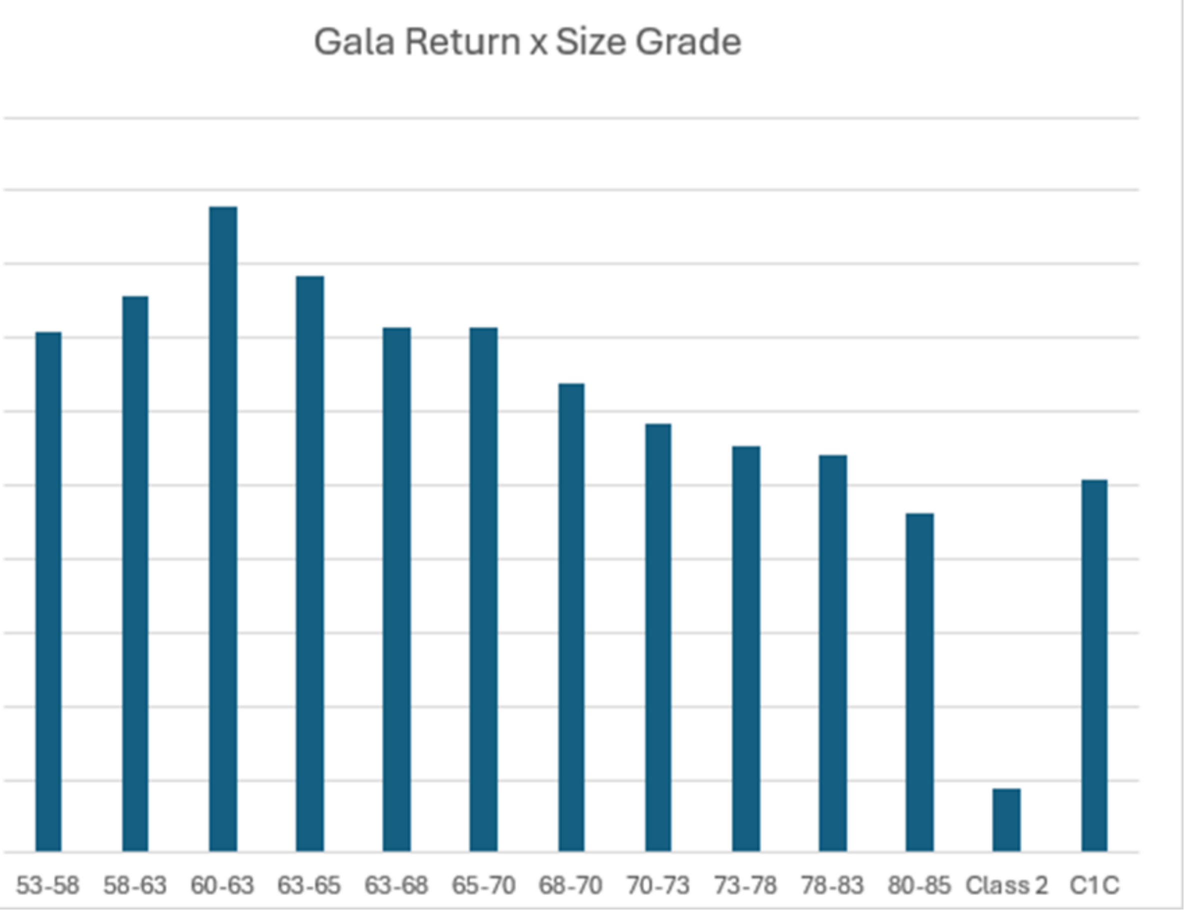
Size Profile



- Size profile has a large impact on return
- Graph shows average Net Return by size band
- **Example below** – 2 orchards – same Class 1 % Grade-out & the same yield (T/Ha)
- £0.13/kg Difference Net Return
- Barnfield's net return was 22.5% more than Tar Tank
- Smaller improvements in size are comparatively more effective than increase in yield

	Tartank	Barnfield
Cl 1. %	93.78%	93.76%
53-60mm	10.58%	16.37%
60-70mm	44.02%	51.71%
70-73mm	10.54%	12.28%
	65.14%	80.36%

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Growing by numbers – why and how?

Target	Elm 1	Jugala	Home Farm Gala	HF Robijn	Grove Cameo	GH Cameo	Blackcurrant Braeburn
Age of Orchard	12	6	14	14	8	2	13
Ha	10.3	7	5.43	2.65	5.09	3.92	4
Trees / Ha	2381	2381	2041	2041	2381	2381	2381
Target Tonnes / Ha	75	80	75	85	80	30	95
Target bins	2317.5	1680	1221.75	675.75	1221.6	352.8	1140
Target Fruit size (mm)	66	66	66	70	67	72	67
Target Av Fruit Weight	0.124	0.124	0.124	0.160	0.143	0.170	0.150
Fruits per kg	8.065	8.065	8.065	6.250	6.993	5.882	6.667
Target Fruits / Tree	254	271	296	260	235	74	266
Plus 5%	267	285	311	273	247	78	279
Orchard Counts Post Thinning	294	237	277	159	229	75	252

2024	Elm 1	Jugala	Home Farm Gala	HF Robijn	Grove Cameo	GH Cameo	Blackcurrant Braeburn
Actual Tonnes / Ha	83.77	84.73	81.47	76.64	85.10	30.89	93.78
Actual bins	2525	1746	1305	592.5	1280	348	1077
Actual fruit size (mm)	65	66	68	71.5	67	69	66
Actual Av Fruit Weight	0.114	0.122	0.135	0.157	0.134	0.158	0.136
Fruits per kg	8.772	8.197	7.407	6.369	7.463	6.329	7.353
Actual Fruits / Tree	309	292	296	239	267	82	290
Delta vs Target	42	7	-15	-34	20	4	10
Delta vs Tree Count	15	55	19	80	38	7	38

Goldilocks (63-70mm)	55.89%	62.63%	63.60%	48.96%	58.39%	51.09%	51.21%
Funsize (53-63mm)	32.16%	26.31%	20.82%	2.02%	19.58%	10.27%	23.83%
Giveaway	8.95%	14.17%	16.94%	12.33%	12.48%	13.37%	18.48%
Gradeout	88.50%	90.30%	89.40%	95.56%	92.43%	95.54%	88.45%

- Growing by numbers takes effort …
- … and is not an exact science!

- Uniformity is important for producing…
- … what your customer wants ...
- … and what your packhouse needs

- We have built in-house models…
- … we tend to under-estimate counts
- … and over-estimate size
- We sense check with advisory notes

- Many annual variables to consider
- Every year is different

Growing by numbers – tree counts

Fruit weights guide:		
61.5mm av gala	100gm =	10 fruits
64.5mm av gala	117gm =	8.5 fruits
66mm av gala	124gm =	8 fruits
67.5mm av gala	134gm =	7.5 fruits
69mm av gala	144gm =	7 fruits

- Uniformity = more accurate forecasting
- We measure weekly if we can
- Annual records build a deep understanding of orchard performance

Apples		Orchard	Jugala Target	Jugala 2022	Jugala 2023	Jugala 2024	Jugala 2025
340		Trees	16500	16500	16500	16500	16500
Pears		Leaf	Planted 2019	4	5	6	7
375		Area	7	7	7	7	7
		Target Bins	1800	1700	1650	1650	1800
Fruits / KG	Fruit Count	Final picked bins	1800	1704	1515	1746	1994
5	50	Fruits / tree	485	485	485	485	485
5.25	60	Fruits / tree	555	555	555	555	555
5.5	75	Fruits / tree	662	662	662	662	662
5.75	100	Fruits / tree	844	844	844	844	844
6	125	Fruits / tree	1011	1011	1011	1011	1011
6.25	150	Fruits / tree	1165	1165	1165	1165	1165
6.5	175	Fruits / tree	1307	1307	1307	1307	1307
6.75	200	Fruits / tree	1438	1438	1438	1438	1438
7	225	Fruits / tree	1560	1560	1560	1560	1560
7.25	250	Fruits / tree	1673	1673	1673	1673	1673
7.5	275	Fruits / tree	1779	1779	1779	1779	1779
7.75	300	Fruits / tree	1879	1879	1879	1879	1879
8.5	325	Fruits / tree	1856	1856	1856	1856	1856
10	350	Fruits / tree	1699	1699	1699	1699	1699
		Yield	85.7	81.1	72.1	83.1	95.0

- *Tree spacing + Total hectares*
- *= Total tree Count*
- *Fruit Counts + Fruit sizing x Total Trees*
- *= Total fruit weight*
- *Divided by Bin weight = Forecast bins*

- *WE MUST INTERROGATE THE DATA …*
- *… and not look for what we want to see*

- *Targeting 7.5 – 8 fruits / kg = 66 / 67mm av.*
- *ACH growing system = 250 - 275 apples / tree*

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Growing by numbers – sizing

Trees	25000				Est Pick Date	12/09/2025			
Area	10.50	1.571428571							for 2nd pick
Elmstone 1 Gala	Fruit Size (mm)								
Date	14/07/2025	25/07/2025	06/08/2025	13/08/2025	20/08/2025	11/09/2025	12/09/2025	17/09/2025	22/09/2025
AVERAGE SIZE (mm)	42.95	49.38	54.28	56.63	58.83	64.65	66.07	65.19	59.57
Min (mm)	37.58	40.60	38.90	42.09	44.00	52.00	55.50	55.00	52.00
Max (mm)	48.26	56.80	65.90	72.94	72.90	79.80	82.48	75.00	71.60
Median (mm)	42.96	49.90	54.58	56.70	58.80	64.10	65.50	65.00	59.00
Weekly change (mm)		4.09	2.86	2.36	2.20	1.85	0.43	-1.02	-3.94
Weeks to go	8.6	7.0	5.3	4.3	3.3	0.1	0.0		
Size at 3mm a week	68.7	70.4	70.1	69.5	68.7	65.1	66.1	65.2	59.6
Smallest at harvest at 2.5mm a week	59.0	58.1	52.1	52.8	52.2	52.4	55.5	55.0	52.0
Min ok on this date at 2.5mm a week 53mm	31.6	35.5	39.8	42.3	44.8	52.6	53.0	53.0	53.0
							Last 5 weeks	1.71	
							Last 4 weeks	1.59	
Sizing	%age 14-Jul	%age 25-Jul	%age 06-Aug	%age 13-Aug	%age 20-Aug	%age 11-Sep	%age 12-Sep	%age 17-Sep	%age 22-Sep
%age 0-35	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
%age 35-40	14.3%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
%age 40-45	64.3%	13.7%	3.5%	0.9%	0.2%	0.0%	0.0%	0.0%	0.0%
%age 45-50	21.4%	38.4%	13.0%	8.9%	2.6%	0.0%	0.0%	0.0%	0.0%
%age 50-55	0.0%	39.7%	34.8%	25.3%	19.8%	1.4%	0.0%	0.0%	12.2%
%age 55-60	0.0%	8.2%	33.0%	38.1%	36.2%	12.2%	9.0%	6.9%	41.9%
%age 60-65	0.0%	0.0%	13.9%	21.8%	29.6%	40.8%	32.0%	39.1%	33.1%
%age 65-70	0.0%	0.0%	0.9%	4.7%	9.8%	34.0%	39.5%	42.7%	11.0%
%age 70+	0.0%	0.0%	0.0%	0.1%	1.8%	11.6%	19.5%	11.3%	1.7%
Total sample	14	73	115	742	500	147	200	248	172

- We look for 2.5 - 3mm a week growth rates in Gala
- Recent years with big crops much less at the end – why?

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Growing by numbers – Brevis Decision Tree (1)

Apple Thinning Risk Assessment 2025																	
Orchard	Crop Load	Frost affected	Hail damage	Pips	Skin Finish	Fruitlet Run	Relative Vigour	Tree Health	Clusters	Age issue	Yield History	Irrigation	Cerone	Thinning agent	Sprayer	Water Volume/ha	Rate
Jugala	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Good	Yes	No	Exilis	Multi	800	7.5
Grove Cameo	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Good	Yes	No	Brevis	Multi	800	1.65
GH Cameo	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	Yes	Good	Yes	No				
2018 Brook Braeburn	Good	No	No	Yes	Good	Yes	High	Good	1,2,3's	No	Good	Yes	No	Exilis	Multi	700	7.5
2021 Brook Braeburn	Good	No	No	Yes	Good	Yes	High	Good	1,2,3's	Yes	Good	Yes	No				
2022 Brook Braeburn	Good	No	No	Yes	Good	Yes	High	Good	1,2,3's	Yes	Good	Yes	No	Exilis	Multi	700	7.5
Devil	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	Yes	N/A	Yes	No	Exilis	Multi	500	7.5
Monty Knights	Good	No	No	Yes	Good	Yes	High	Good	2,3,4's	No	Good	Yes	No	Brevis	Single	600	1.25
Blackcurrants Braeburn	Good	No	No	Yes	Good	Yes	High	Good	2,3,4's	No	Good	Yes	No	Brevis	Single	600	1.25
Elmstone 1	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Good	Yes	No	Brevis	Multi	800	1.65
Elmstone 2	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Good	Yes	No	Brevis	Multi	800	1.65
Walmestone	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Good	No	No	Brevis	Multi	800	1.65
Walmestone Grafts	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	Yes?	Good	No	No	Exilis	Multi	600	7.5
Warefield Gala	Good	No	No	Yes	Good	Yes	High	Good	2,3,4's	Yes	N/A	Yes	No				
Warefield Braeburn	Good	No	No	Yes	Good	Yes	High	Good	2,3,4's	No	Good	Yes	No				
Little Hoaden (OLD)	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Mixed	Yes	No	Brevis	Single	700	1.65
Block 13	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Mixed	Yes	No	Brevis	Multi	650	1.65
Block 24	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Good	Yes	No	Exilis	Multi	800	7.5
Lowdells	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	Yes	N/A	Yes	No				
Thatchers	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	Yes	N/A	Yes	No				
Westmarsh Gala	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Good	No	No	Brevis	Multi	800	1.65
Westmarsh Robijn	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Good	No	No	Exilis	Multi	700	7.5
NBF Cabaret	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Mixed	Yes	No				
NBF Magic Star	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	Yes	N/A	Yes	No				
NBF Gala	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Good	Yes	No	Brevis	Single	700	1.65
NBF Braeburn 1	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Mixed	Yes	No				
NBF Braeburn 2	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Mixed	Yes	No				
Hoath Gala Polo 1 & 2	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Mixed	Yes	No	Exilis	Single	700	7.5
Hoath McGinn Cameo	Good	No	No	Yes	Good	Yes	High	Good	3,4,5's	No	Good	Yes	No	Exilis	Single	700	7.5

- This is about risk management
- We are trying to rely on data as much as (more than?) grower instinct

Growing by numbers – Brevis Decision Tree (2)

Apple Thinning Risk Assessment 2025					Previous 7 Days			DECISION DATE AND MODEL		Future 7 Days				
Orchard	Thinning agent	Sprayer	Water Volume/ha	Rate	Dull Days	Warm Nights	Humid	Assessment Date	Efficacy Model	Dull Days	Warm Nights	Humid	Decision	Date Applied
Jugala	Exilis	Multi	800	7.5	4	8-10deg	40-60%	19/05/2025	Green	7 part days...	4-10 deg	40-80%	Exilis	21/05/2025
Grove Cameo	Brevis	Multi	800	1.65										
GH Cameo														
2018 Brook Braeburn	Exilis	Multi	700	7.5	4	8-10deg	40-60%	19/05/2025	Green	7 part days...	4-10 deg	40-80%	Exilis	21/05/2025
2021 Brook Braeburn														
2022 Brook Braeburn	Exilis	Multi	700	7.5	4	8-10deg	40-60%	19/05/2025	Green	7 part days...	4-10 deg	40-80%	Exilis	21/05/2025
Devil	Exilis	Multi	500	7.5										
Monty Knights	Brevis	Single	600	1.25	4	8-10deg	40-60%	19/05/2025	Green	7 part days...	4-10 deg	40-80%	Brevis	20/05/2025
Blackcurrants Braeburn	Brevis	Single	600	1.25	4	8-10deg	40-60%	19/05/2025	Green	7 part days...	4-10 deg	40-80%	Brevis	19/05/2025
Elmstone 1	Brevis	Multi	800	1.65	4	4-10deg	50-80%	22/05/2025	Green	7 part days...	7-13deg	60-100%	Brevis	23/05/2025
Elmstone 2	Brevis	Multi	800	1.65	4	4-10deg	50-80%	22/05/2025	Green	7 part days...	7-13deg	60-100%	Brevis	23/05/2025
Walmestone	Brevis	Multi	800	1.65	4	4-10deg	50-80%	22/05/2025	Green	7 part days...	7-13deg	60-100%	Brevis	23/05/2025
Walmestone Grafts	Exilis	Multi	600	7.5										
Warefield Gala														
Warefield Braeburn														
Little Hoaden (OLD)	Brevis	Single	700	1.65										
Block 13	Brevis	Multi	650	1.65	4	4-10deg	50-80%	22/05/2025	Green	7 part days...	7-13deg	60-100%	Brevis	23/05/2025
Block 24	Exilis	Multi	800	7.5	4	8-10deg	40-60%	19/05/2025	Green	7 part days...	4-10 deg	40-80%	Exilis	20/05/2025
Lowdells														
Thatchers														
Westmarsh Gala	Brevis	Multi	800	1.65	4	4-10deg	50-80%	22/05/2025	Green	7 part days...	7-13deg	60-100%	Brevis	23/05/2025
Westmarsh Robijn	Exilis	Multi	700	7.5	4	8-10deg	40-60%	19/05/2025	Green	7 part days...	4-10 deg	40-80%	Exilis	19/05/2025
NBF Cabaret														
NBF Magic Star														
NBF Gala	Brevis	Single	700	1.65	4	4-10deg	50-80%	22/05/2025	Green	7 part days...	7-13deg	60-100%	Brevis	23/05/2025
NBF Braeburn 1														
NBF Braeburn 2														
Hoath Gala Polo 1 & 2	Exilis	Single	700	7.5										
Hoath McGinn Cameo	Exilis	Single	700	7.5										

- The variables scare us half to death and we have been too conservative
- As we learn we plan to be more aggressive with Brevis

Factors Affecting Brevis

Brevis *mimics shading* by interfering with the photosynthetic process, curbing the production of carbohydrates used for tree growth. The stressed tree then directs its carbohydrate supply to the shoots and leaves at the expense of the fruitlets. As a result, the smaller fruitlets are dropped.

Factors to consider when applying Brevis:

- Warm night time temperatures (above 10°C) in the 7 days prior to and post application will lead to elevated tree respiration. This in turn draws on the tree carbohydrate reserves, further stressing the tree. Therefore, the thinning effect of Brevis will be greater
- Extended periods of low light (overcast cloudy conditions) also reduce carbohydrate production and increase tree stress. Again, the thinning effect of Brevis will be greater
- If both conditions occur, that is, days are cloudy and night time temperatures high (high respiration), then the thinning effect will be at its greatest. In these instances, care should be taken to avoid over-thinning

Additional factors to consider:

- Orchard history (Yields, Natural Thinning, Brevis effect)
- Apple variety
- Tree vigour and age
- Cluster counts and natural run
- Strong or weak flowering and weather conditions (Frost, Hail, Skin Finish?)
- Winter Chill Units (may be an issue in the future?)
- Hail netting (excess shade?)
- Check seeds per fruit! This is critical to determining the application rate

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Impact on tree structure decision making

- What are the growth stages where we can impact on yield, size and quality?

- Post harvest spraying – “filling the larder”
- Winter pruning – “tree structure and renewal”
- Root pruning – “managing tree vigour / size”
- Bud counting – “bud extinction”
- Pollination – “set”
- Chemical thinning – “blossom eradication with ATS”
- Chemical thinning – “Brevis and 6BA”
- Hand thinning – “quantity thin”
- Summer pruning (by hand and / or cutter bar) – “colour”
- Late hand thinning – “quality thin”
- Harvest – “final opportunity to get it right!”

- All of the above should be implemented on the basis of regular assessments of bud counts, fruit counts and sizing across the entire growing season
- The earlier we get the right number of fruits on the tree the better

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