

Gross Margin analysis comparison of weaner calf system mating Angus breeding cows to either Angus bulls or Charolais bulls on an extensive East Coast summer dry breeding property.

Abstract:

An analysis was carried out to identify whether specific beef breed marketing agreement premiums that are passed on to the calf producer at weaner fairs are sufficient to compensate for the loss of hybrid vigour when within-breed mating cattle.

A Gross Margin analysis was calculated comparing the Gross Margin per cow wintered and cents per KgDM consumed per cow wintered for within breed (Angus) and terminal sire (Charolais) mated Angus cows on a typical coastal East Coast Hill Country breeding station.

The analysis showed that terminal sired calves were on average 34Kg live weight heavier than the within breed sired calves at weaning, that they returned \$30/calf more calf income which resulted in terminal sire mated cows achieving \$31/cow wintered and 0.7cents/KgDM higher Gross Margin than within breed mated cows.

Introduction:

The introduction of breed specific marketing initiatives has led to significant price premiums for the breeds involved in these marketing agreements. The Charolais Breeders New Zealand initiated this analysis to identify whether the premiums paid for weaners are sufficient to compensate for the loss of hybrid vigour when within breed mating all cattle on a property, as opposed to cross breeding using terminal sire bulls.

Method:

A property was chosen where approximately half of the breeding cows were mated to a within breed bull (Angus) and half of the cows were mated to a terminal sire bull (Charolais). The property used for this analysis was Waimoana Station. 217 Glenburn Road, RD 3, Masterton.

All cows were run as one mob except during mating. All calves were sold at weaning to provide a direct comparison between the bull breeds used. Therefore all replacement cows were purchased as R3 VIC heifers in-calf to a pure bred Angus bull.

A property was chosen that was at the "harder" end of typical East Coast Hill Country, where breeding cows are run to provide a valid comparison.

A standard Gross Margin analysis was carried out calculating the Gross Margin in terms of \$/cow wintered. The actual financial and physical data from the 2011/12 financial year for Waimoana Station was used for this analysis.

A second standard Gross Margin analysis was calculated in terms of cents/KgDM consumed per cow wintered. The dry matter consumed per cow was calculated assuming that 40% of the extra live weight of the terminal sired bull calves was due to hybrid vigour and 60% due to the extra feed consumed by the higher live weight calves (Profitable Farming of Beef cows 2009. Morris and Smeaton). AgResearch Feed Smart tables were used to calculate the KgDM consumed by the cows plus pure breed calves and the cows plus terminal bull sired calves.

Analysis:

Waimoana Station. Glenburn Road, Masterton is a summer-dry coastal breeding property 51Km east of Masterton. Table 1 summarises the details of Waimoana Station.

Table 1: Property details of Waimoana Station:

Effective Area	660ha
Hills effective area	500ha
Flats total area	160ha
Flats cultivatable area	110ha
Soil type hill	Argillite/Sandstone
Soil type flats	Sandy silt loam
Average Rainfall	1200mm
Elevation	10 to 400m asl
Total SU	4500
Sheep: Cattle ratio	80:20

Table 1 shows that Waimoana Station is made up of 75.8% free draining low fertility hill country, 16.7% moisture retentive cultivatable flats and 7.5% low lying marsh flats. With an average rainfall of 1200mm pa Waimoana Station would appear to have good rainfall but it is marked by a distinctive winter maximum, free draining hill soils and high wind speeds making it particularly summer dry.

Fertilizer and cropping:

From 2007 until 2012, 204 tonnes of agricultural lime plus elemental sulphur (at 50Kg of 95% sulphur/ha) has been applied by air to 500ha of hill country (408Kg/ha) per annum, the flats have received 250Kg/ha of 9% P Super phosphate per annum applied by truck.

Eight ha of Sovereign Kale is sown each November by conventional cultivation technique with 225Kg/ha of DAP applied in furrow at sowing, replacement ewe lambs graze the kale in February to ensure that they achieve their minimum target mating weight of 40kg lwt by mating on the 1st of May. When sufficient leaf has been removed 50Kg/N/ha is applied as Urea and the kale is shut up until winter when in lamb ewe hoggets graze the kale in 2ha blocks. After the ewe hoggets have removed most of the leaf dry matter yield of the kale, low condition score cows graze the remaining kale dry matter in the final month of pregnancy before calving. New Tonic plantain and white clover pastures are established in the spring.

Sheep breeding policy:

Waimoana Station runs a Perendale breeding ewe flock, selling store lambs and mating ewe hoggets. Table 2 shows a breakdown of the breeding ewe numbers at Waimoana.

Table 2: Sheep numbers, mating, lambing, weaning date and ram breed at Waimoana station.

Mob	Tally	Mating date	Lambing date	Weaning date	Ram breed
5 year ewes	200	22 nd March	15 th August	30 th Nov	South Suffolk
Ma ewes	1700	1 st th April	25 th August	7 th December	Perendale
2 tooth ewes	800	1 st th April	25 th August	7 th December	Perendale
Ewe hoggets	800	1 st th May	1 st October	21 st Dec	South Suffolk
Ewe hoggets	200	Not mated	Dry		

The average ewe lambing % in 2011 was 125% from a scanning % of 156.5% (lamb wastage 20%), Ovisstim has been used for 1 year lifting lambing % by on average 7% from previous lambing percentages. The scanned in lamb ewe hoggets have lambed at 70% in 2011. Any lambs 25Kg lwt or less at weaning are sent to an 80ha support/finishing block at Gladstone, otherwise all male lambs are sold at weaning and surplus ewe lambs are sold store. The majority of the under 25Kg lwt lambs that are grazed at Gladstone are fattened as prime lambs and a small number are sold store. After

weaning the replacement ewe lambs are grazed on the hill country and on the flats. In lamb ewe hoggets are lambed on the flats to ensure high lamb survival and good 2th weaning weight. Scanned twin ewes are set stocked in the easier hill paddocks at 6/ha /ha and single scanned ewes are set stocked in the harder hill paddocks at 7/ha /ha.

Cattle Policy:

Waimoana Station runs a pure breed Angus herd of breeding cows selling weaners and purchasing replacement VIC R3 heifers, no young stock are wintered. The best conformation/condition score Angus cows are mated to an Angus bull (65 cows 2011 mating). All the remaining Angus cows are mated to a Charolais bull (64 cows 2011 mating). The replacement VIC R3 heifers are purchased after scanning when dries and CFA cows are culled. On average 18 to 20 VIC R3 heifers are purchased each winter to maintain the herd at a target of 140 cows. The average purchase price in 2011 was \$900/head plus \$10 /head cartage. Following the dry autumn of 2011, 108 VIC cows were wintered as the in calf rate from that seasons bulling was 83. Normally in calf rates range from 90% to 95% but 96.5% has been achieved during the 2012 bulling season.

Cows are used to remove low quality feed after weaning, any low condition score cows are grazed on kale during the month before calving. The lighter and younger cows (a small % of the herd) are set stocked for calving at 1 cow per 3.5ha in the easier hill paddocks amongst SIL twin ewes and 1 cow per 4 ha on the steeper, larger hill paddocks amongst SIL single ewes. During the 2011 calving season the breeding cows weaned 90% calves per set stocked cow.

Animal Health:

VIC R3 heifers receive a double combination oral drench on arrival. All cows receive 2mls of 60mg/ml of copper and 5ml of 5mg/ml elemental selenium twice a year: mid-winter and at bull removal. At the 30th of June blood sampling in 2010 indicated that average blood serum copper levels were 10.9um/l with an adequate range of 8.0um/l to 18.8um/l. Although a liver biopsy is considered a more reliable indicator of copper levels in the cow it was decided not to subject VIC cows to the biopsy procedure. Blood glutathione peroxidase levels of 10.42KU/l (with an adequate range of 2KU/l to 50KU/l) indicated that selenium levels were also adequate.

Cows also receive a synthetic pyrethroid Lice pour on during July. No other animal health treatments are administered, however blood sampling for Bovine Viral Diarrhoea (BVD) antibodies at scanning 2012 indicated that although there were no PI's in the herd many of the cows showed high antibody levels indicating herd exposure. A BVD control/vaccination programme is to commence in 2012 with all bought-in VIC R3 heifers being isolated from the rest of the herd until vaccination and all younger cows will receive a sensitizer and booster vaccination prior to the 2013 bulling season. All bulls will receive a BVD booster vaccination prior to bulling in coming seasons. Bulls are service capacity tested prior to mating.

All calves are given a Mectin based pour on during the first week of February.

Bulls:

Commercial high EBV R2 BVD negative Charolais bulls are purchased. Prices have ranged from \$3500/head to \$4200/head with Charolais bulls completing 4 bulling seasons on average. High EBV R4 BVD negative Angus bulls that have been used by an Angus stud for two matings have been purchased in the past at a cost of \$2700/head these previously used bulls are used for 2 bulling seasons on average. Cull Charolais bulls have averaged \$1500/head and the lighter carcass weight cull Angus bulls \$1200/head. During the 2011 bulling season 65 Angus cows were run with 2 Angus bulls and 64 Angus cows were run with 2 Charolais bulls (due to paddock size and terrain) giving a ratio of 1 bull per 32 to 32.5 cows but this can be as high as 1 bull per 35 cows when Waimoana Station is running its maximum 140 breeding cows.

One bull is replaced per year. Table 3 compares the Group Breedplan average EBV's of the bulls used at Waimoana Station.

Table 3: Selected Group Breedplan EBV's for Angus and Charolais bulls used at Waimoana Station.

2010 Australasian Angus Group Breedplan EBVS											
	200 day wt (Kg)	400 day wt (Kg)	600 day wt (Kg)	Mat cow wt (Kg)	Milk (Kg)	Carcass wt (Kg)	Eye Muscle area (cm2)	Rib fat (mm)	Rump fat (MM)	Retail beef yield (%)	IMF %
785 ET AB	+43	+81	+108	+108	+15	+55	+3.4	-0.4	-0.7	+0.6	+0.6%
B45 AB	+39	+78	+95	+85	+10	+55	+1.7	-0.6	-0.6	-0.1	+0.9
Av ANG EBV	+36	+67	+86	+80	+12	+48	+2.8	-0.1	-0.1	+0.2	=0.8
2010 Australasian Charolais group Breedplan EBVS											
E25	+11	+23	+40	+42	-1	+18	+0.8	+0.2	+0.3	-0.1	-
Av Ch EBV	+9	+17	+19	+17	+2	+13	+1.2	+0.1	+0.2	+0.1	+0.1

Table 3 does not try to compare the Angus and Charolais bulls used at Waimoana Station directly but does indicate that all the bulls used of both breeds had EBVS well above average.

Both Charolais and Angus sired calves were marked and bull calves steered just prior to bull introduction on the 8th of November.

The predicted start of calving is the 15th of August with mean calving date the 1st of September.

All calves are weaned and sold at the first Masterton weaner fair on the second Wednesday in March. Table 4 summarises the weaner sales for the 14th March 2012 (average calf age 196 days) all calves were weighed at Waimoana Station prior to trucking to Masterton.

Table 4 Weaner calf sale results 14/03/12

2012 weaner sales results					
	Tally	Average weight Kg lwt	\$/Kg lwt gross	\$/head net of comm + cart	Average growth rate Kg lwt/day
Charolais X Steers	26	280Kg lwt	\$2.69/Kg lwt	\$704.47/hd	1.25Kg/day
Charolais X Heifers	22	231Kg lwt	\$2.80/Kg lwt	\$605.57/hd	1.00Kg/day
Total Charolais X	48			\$659.14/hd	
Angus X Steers	30	229Kg lwt	\$3.05/Kg lwt	\$653.18/hd	0.99Kg/day
Angus X Heifers	19	215Kg lwt	2.95/Kg lwt	\$591.75/hd	0.92Kg/day
Total angus X	49			\$629.36/hd	

Table 4 shows that despite the Angus sired calves making a higher price per Kg of live weight the Charolais sired calves as a result of their higher daily live weight gain, resulting in a 7% to 22% higher weaning weight for heifers and steers respectively netted \$29.78/head more than the Angus sired calves.

Gross Margin Analysis:

The above information can be used to calculate the Gross Margin in terms of \$/cow wintered or cents/kgDM consumed a \$/ha Gross Margin cannot be calculated for this system as the cows do not graze a set area. Table 5 details the cost per cow wintered associated with the calves sold for each bull breed mob.

Table 5: Direct costs associated with Charolais and Angus mated Angus cows.

	Charolais mated cows (\$/cow)	Angus mated cows (\$/cow)
Lice pour on	\$2.03	\$2.03
Copper (2x2mls)	\$1.40	\$1.40
Selenium (2x5mls)	\$0.16	\$0.16
Mectin Pour on calves (90%) per cow	\$0.68	\$0.61
Bull cost/cow (See appendix 1)	\$19.82	\$24.52
Fertiliser \$/cow (See appendix 2)	\$63.88	\$63.88
Replacement cow costs (See appendix 3)	\$26.59	\$26.59
Total direct cost per cow wintered	\$114.56/cow	\$119.19/cow

Table 5 shows that despite the lower cost of pour on for the Angus sired calves due to their lower live weight, the higher bull replacement costs for Angus bulls compared to similar quality Charolais bulls results in Angus mated cows costing \$4.63/per cow more to run for the year than Angus mated cows.

These cow variable costs can then be deducted from the net calf income resulting in a Gross Margin per cow wintered. At Waimoana Station 90% of cows wintered weaned a calf during the 2011 calving. A calving percentage of 90 has been used in this margin analysis.

Table 6 details the Gross Margin in \$/cow wintered for Charolais and Angus mated Angus cows.

Table 6: Gross Margin in \$/cow wintered for Charolais and Angus mated Angus cows.

	Charolais mated cows (\$/cow)	Angus mated cows (\$/cow)
Calf net income (90%)	\$593.23	\$566.42
Total direct cost per cow mated	\$114.56	\$119.19
Gross Margin \$/cow wintered	\$478.67	\$447.23

Table 6 indicates that cows mated to Charolais bulls produce a Gross Margin \$31/cow higher; however despite all cows consuming the same amount of dry matter the higher growth rate Charolais sired calves consume more feed once they start to eat pasture. Heterosis accounts for 40% of the extra growth rate of the Charolais sired calves and the extra feed they consume 60% (Profitable Farming of Beef Cows 2009. Morris and Smeaton). Therefore by weaning the Angus mated cows plus their Angus calves have consumed 4007KgDM/cow wintered and the Charolais mated cows plus their Charolais X calves have consumed 2.3% more feed or 4099KgDM per cow wintered. Table 7 details the Gross Margin in cents/KgDM consumed for Charolais and Angus mated Angus cows.

Table 7: Gross Margin cents/KgDM consumed for Charolais and Angus mated Angus cows.

	Charolais mated cows	Angus Mated cows
Gross Margin \$/cow	\$478.67	\$447.23
Feed consumption kgDM/cow	4099	4007
Gross Margin cents/kgDM	11.7 cents/KgDM	11.1 cents/KgDM

Tables 6 show that Charolais mated Angus cows produce a Gross Margin of **\$479/cow** compared to Angus mated Angus cows producing a Gross Margin of **\$447/cow** or a 7% higher Gross Margin, Table 7 indicates that despite the Charolais sired calves consuming more feed over the summer period they still produce a Gross Margin in terms of cents/KgDM consumed 5.25% higher than Angus sired calves from the same dam breed (**11.7 cents/KgDM** consumed compared to **11.1 cents/KgDM** consumed).

The extra feed consumed is late spring early summer surplus and not valuable winter feed, creating better quality pastures for sheep.

Breeding cow Gross Margins in cents/kgDM are a third higher for the 2011/12 season than the past 3 years due to higher average calf sale weights coupled with higher sale prices.

Summary:

Mating pure bred breeding cows to terminal sire bulls (even if only a B mob) can increase Gross Margins by **\$31/cow** wintered compared to mating the cows to a bull of the same breed. This is without increasing the winter feed demand. For a 100 breeding cow herd where half of the cows are mated to a terminal sire bull this represents an extra **\$1550/pa** margin to the breeding cow enterprise as a whole.

Due to the random nature of gene recombination the 2011 calving resulted in the Charolais mated cows giving birth to 54% bull and 46% heifer calves whereas the Angus mated cows gave birth to 61% bull and 39% heifer calves. If both breeds had resulted in a more normal 52% bull and 48% heifer calves the Gross Margin would have been an extra **\$35/cow** wintered or an extra **0.7cents/KgDM** consumed higher per cow wintered for the terminal sire (Charolais) mated cows.

Waimoana Station has been buying ex-stud R4high EBV Angus Bulls. If they had been buying above average EBV R2 Angus Bulls (\$6500/bull) this would have resulted in the bull cost per cow wintered increasing to **\$42.21** resulting in the Gross Margin per cow wintered dropping to **\$429/cow** or **10.7 cents/KgDM** consumed which equates to **\$49.cow** (10%) or **1cent/KgDM** consumed lower Gross Margin than the Charolais mated cows.

Conclusion:

The premiums available for pure bred beef cattle via breed initiated marketing schemes that are passed on to the calf breeder at weaner fairs are not adequate to compensate for the loss in hybrid vigour from not using terminal sire bulls.

The additional gross margin that can be made from using terminal sire bulls over pure breed cows run on hard hill country ranges from **7% to 11%** per cow wintered or between **5% and 15%** higher Gross Margins in terms of cents/KgDM consumed compared to using bulls of the same breed. The Gross Margins produced may have been higher on easier country where more feed may have been available a separate analysis would be required to test this hypothesis.

Appendix 1:
Bull costs per cow wintered.

	Charolais	Angus
Average bull purchase price \$/head	3850.00	2700.00
Cull value \$/head	1500.00	1200.00
No of seasons	4	2
Service capacity test \$/head	46.94	46.94
No of cows mated	32	32.5
Cost/cow mated	\$19.82	\$24.52

Appendix 2:
Hill country fertiliser costs.

	\$
Lime \$/t	18.00
95% Sulphur \$/t (140Kg/t lime)	60.20
Transport \$/t	25.00
Air strip costs \$/t	5.00
Application \$/t	75.00
Total cost \$/t	183.5
\$/ha applied	74.75
Total cost 500ha \$	37375.00
\$/cattle enterprise (20% cattle)	7475.00
117 cows \$/cow	63.88

Appendix 3:
Cow replacement costs:

	\$
18 cows (220Kg cwt @ \$3.27Kg cwt net) \$719.40/hd	12949.20
18 R3 VIC @ \$910.00/hd delivered	16380.00
Net replacement costs per annum	3430.80
Net replacement cost per cow (117 cows) per annum	29.32