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Angus Elite Progeny Test

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Angus Elite Progeny Test

Final Report

2007

Table of Contents

Executive Summary

The Angus Elite Progeny Test (AEPT) has been a co-operative activity between Angus Australia, Angus breeders, MLA, NSW DPI and the Beef CRC. This support and co-operation has allowed testing of Australian Angus bulls under carefully controlled conditions to identify high value Australian genetics for domestic and export use. All parties have contributed by nominating bulls, collecting and analysing information and presenting results. The operation of the AEPT was overseen by a Management Committee of breeders and participating parties who set policy and direction.

Cattle were bred at NSW DPI Trangie Research Station then grown out under pasture conditions before steers were feedlot finished with carcases assessed for the medium fed export markets. The process has demonstrated that Australian Angus cattle perform well under these conditions. Even in challenging years, steers reached feedlot intake weights, grew out well under feedlot conditions and met market targets.

Differences in the performance of bull progeny were identified over a range of criteria. The bulls that excelled have produced steer progeny that met growth and market targets with desirable feed efficiency. They also bred daughters that reproduced easily and were good mothers.

The results of the AEPT have provided valuable information to allow evaluation of the beef industry performance recording system, Breedplan. When actual progeny performance is compared against the Estimated Breeding Values (EBVs) of the bulls when they were selected to enter the program, the results confirm that Breedplan predicts progeny performance accurately.

Data collected in the conduct of the AEPT has been available to assess the value of new industry tools like IGF-1 testing for feed efficiency and gene markers for marbling and feed efficiency. Having steers with slaughter data and tested feed efficiency provided a valuable resource to test for other physiological markers for a range of traits. Cooperative work with the Cattle and Beef CRC, NSW DPI and Adelaide University made the most of this resource.

Recommendations for improving Breedplan analysis based on results of the AEPT have been made and most of them are currently being implemented.

Background

The Angus Elite Progeny Test was proposed in 2000 and commenced with the first joining of females in 2001. MLA joined with Angus Australia in setting up a Donor Company to administer and fund the program. The Donor Company then contracted NSW Agriculture for the use of their Trangie herd and facilities with other parties like Cattle and Beef CRC to be contracted to conduct feed efficiency testing.

The progeny test aimed to assist Australian breeders to position themselves in the global genetics market by providing quality progeny test information on potentially elite young sires. In addition, the program aimed to provide valuable information to enhance the genetic tools available to all cattle breeders in Australia.

Breeders were invited to nominate bulls for the AEPT with the bulls used in the NSW Department of Primary Industry (previously NSW Agriculture) herd of Angus cows at Trangie, NSW. Calves generated were to be grown out with data collected on growth performance, structural soundness and ultrasound measurements of fat depth, eye muscle area and marbling of all progeny. The steer progeny were to be finished on grain and slaughtered, with additional measurements taken on feed intake, growth performance and carcase traits. A proportion of the heifer progeny (approximately 10 per sire) were to be retained in the Trangie herd for collection of data on reproductive and maternal performance.

Trangie

NSW DPI's Angus herd at Trangie Research Centre is a unique resource for genetic research. The female herd is fully Breedplan recorded and was used previously for research into feed efficiency. Most females in the herd were themselves measured for Net Feed Intake (NFI) and this contributed to the accuracy of results when progeny of test sires were measured. In hindsight, one of the limitations of the Trangie herd was the lack of carcase data collected on the herd before the progeny testing began. Few of the females used as joining cows had been scanned as heifers and this made assessing the value of the bull's contribution to progeny carcase data less accurate.

In addition, staff at Trangie were experienced in collecting accurate performance data and dedicated to that task. The cooperation of Tom Snelgar, Dave Mula and Karen Dibley to this project can not be overemphasised. They were hard working, diligent and made the whole program happen. Other Centre staff also assisted in organising field days, conducting AI programs, structural scoring and a range of other activities.

The 400+ cow herd at Trangie and the facilities available provided a chance to conduct a large scale progeny test. Over three years, 38 young sires were tested. Replacement heifers were selected to enter the herd and cattle were fed during some very trying seasons to maintain fertility and to ensure the success of the AI programs. Other NSW DPI properties at Glen Innes and Grafton backgrounded steers for the program.

Bull Selection

Each year, ten bulls were selected for AI use and three bulls for natural service. Breeders were encouraged to nominate bulls that they thought were of sufficient standard to warrant investment in them. Nominations were ranked on their CAAB $Index with two other selection criteria; no more than two bulls from any one breeder and no more than two AI bulls by any one sire. Natural service bulls had to meet an additional requirement of coming from a Johnes MAP NM3 status herd. Natural service sires were selected first and then the AI sires. Double ups in sires between natural service and AI sires were allowed in order to get the natural service bulls.

Breeders nominating bulls were responsible for collecting semen which could be custom collected. They were also liable for a fee to cover the cost of running the AEPT. This fee was payable over 3 years. Good numbers of bull nominations were received for the first two years but lower nominations were received in year 3. This is the only year where more than one nomination per breeder was successful although the standard of the bulls selected was still high.

Bulls included in the AEPT for each year are shown below:

Table 1 Round 1 bulls, joining 2001, calving 2002

BREEDER	**PROGENY TEST BULL**	**IDENT**	**SIRE**
Bulle Family, NSW	Ardrossan New Design V053	NAQ V53	B/R New Design 323
Robert Campbell, Vic	Campbell Farms Emulation V536	VVX V536	Brooks Traveler 217
Michael Ball, NSW	Comfort Hill Stockman U26	BBA U26	TC Stockman 365
Andrew White, NSW	Eastern Plains New Design U5	NEP U5	B/R New Design 036
Albert McIlroy, Vic	Edi Angus A Rito S8	CMF S8	Tehama 5204 Trav 565
Fred Bell, NSW	Glenavon United U39	NFW U39	B/R New Design 036
Nick Burton-Taylor, NSW	Kennys Creek Tonkin T25	NDI T25	Glenoch Megaforce
Alec Cardwell, Vic	Mitta Valley Titan T63	CDJ T63	Rito 5TR8 of Rita 3X12
A. & J. Wrigley, NSW	Moogenilla V22	BWF V22	Butch's Maximum 3130
A. & D. Raff, Qld	Raff Ultimate U27	QRF U27	TC Stockman 2164
B. & L. Corrigan, NSW	Rennylea U214	NOR U214	Summitcrest Scotch Cap OB45
Bill Cornell, NSW	St Pauls Trav-Albert T67	NST T67	Alberda Traveler 416
Loch Rogers, NSW	Wattletop Vibe V86	NWP V86	B/R New Design 036

Table 2 Round 2 bulls, joining 2002, calving 2003

BREEDER	**PROGENY TEST BULL**	**IDENT**	**SIRE**
John & Ken Sylvester, NSW	Five Star Whiskey W6	BGX W006	SAF Focus of ER
Kansas Livestock, NSW	Kansas Pied Piper W19	NKL W19	Ythanbrae Precision U28
Michael Ball, NSW	Comfort Hill Yellowstone W86	BBA V86	Vermillion Yellowstone
Andrew White, NSW	Eastern Plains Max W7	NEP W7	Butches Maximum 3130
Lew Smit, WA	Koojan Hills Somethin Special W26	WKH W26	CA Future Direction 5321
Tony Manchester, NSW	Rosevale V9	NQM V9	Scotch Cap
Nick Burton-Taylor, NSW	Kennys Creek Headliner V87	NDI V87	Summitcrest Scotch Cap OB45
Twynam Pastoral Co, Vic	Twynam Uppercut U85	NXT U85	B/R New Design 036
Ed Blackadder, NSW	Wallaroy Vanguard 2000 V189	NED V189	Circle A 2000
Keevers and Martin, NSW	Alumy Creek KM Future Direction W03	NKE W03	CA Future Direction 5321
Bald Blair Past Co, NSW	Bald Blair New Design V86	NBB V86	B/R New Design 036
Bill Cornell, NSW	St Pauls Vampire V51	NST V51	Alberda Traveler 416
Loch Rogers, NSW	Wattletop Wooly W120	NWP W120	Rockn D Ambush 1531

Table 3 Round 3 bulls, joining 2003, calving 2004

BREEDER	PROGENY TEST BULL	IDENT	SIRE
Mark and Mandy Wales, NSW	Alloura Warrior W06	DGJ W06	CA Future Direction 5321
Booroomooka Angus, NSW	Booroomooka Westall W391	NGM W391	CA Future Direction
JB& MA Macri, WA	Brumar Vanquish V9	WMC V9	Kansas Rancher R6
Hazeldean Pastoral Co, NSW	Hazeldean V113	NHZ V113	Butchs Maximum 3130
Hidden Valley Angus, SA	Hidden Valley Existence X18	SEW X18	Perry Power Design 715
Hidden Valley Angus, SA	Hidden Valley Expectation X11	SEW X11	Bon View New Design 878
Christopher Story, VIC	Lawsons GAR Precision W363	VLY W363	GAR Precision 1680
John Young, WA	Strathtay Universe X19	WJY X19	GDA Universe 726G
J& J Woodruff,, VIC	Witherswood Waterloo W93	CWJ W93	BT Ultravox 297E
Christopher Story, VIC	Ythanbrae New Design 036 V429	VLY V429	B/R New Design 036
Bald Blair Angus, NSW	Bald Blair RockN D X63	NBB X63	Rockn D Ambush 1531
Wattletop Angus, NSW	Wattletop Future Direction X27	NWP X27	CA Future Direction

AI Programs

400 cows were allocated to the AI program each year. Another 10 cows per sire were run with the natural service bulls from the start of joining so they could have calves born at the same time as AI calves. Contract AI companies tendered for the AI business and were selected on price and experience. By chance, different contractors were involved each year. Each contractor did a great job of organising the AI program which was run in conjunction with the Trangie staff. Only cows were selected for the AEPT and no heifers or first calvers were joined to test sires. Cows were synchronised using CIDRs and injections decided by the contractors and staff. Two cycles of AI were included then the natural service bulls were introduced as backup bulls for two more cycles.

Results were similar over the three joinings and are shown below:

Table 4 Joining results

Joining Year	2001	2002	2003
No Cows joined	400 AI + 30 NS	398 AI + 29 NS	400 AI + 30 NS
No Calves to 1st AI	222 (55.5%)	206 (52%)	207 (52%)
No Calves to 2nd AI	52 (46%)	77 (74%)	73 (56%)
Total AI calves	274 (69%)	283 (71%)	280 (70%)
Backup bulls	81	48	57
Total Conception rate	92%	85%	85%
No calved	398	356	367
No Calf deaths	16	15	13
Cows PTIC that failed to calve	3	15	13
No Live calves	378	341	354
Calving %	88%	80%	82%

The lower reproductive rate in 2002 and 2003 reflected the tougher seasons but were at least acceptable due to the feeding of the cows involved. Considering the tough seasonal conditions these conception rates are good.

Calving Performance

At calving, all calves were recorded on the day of birth. Calves were tagged with an NLIS tag and management tag, weighed, a DNA sample collected and records of calving ease, single or multiple birth, calf sex and any comments taken. Calving ran from July to September each year. The calving season was extremely busy, especially in the first few weeks. In 2002, a large numbers of calves were born in a concentrated period. AI started on 12 October to give an expected calving date of 19 July. The first calves arrived on 30 June and by 19 July, there were already 97 calves born. Another 25 calves were born on July 19. 115 calves were born in the busiest week. Similar results were experienced in following years.

In each year, calves were lost at calving, even though the females involved were all cows. No heifers were used to generate the progeny test calves. Most losses were associated with twin calves, early born lightweight calves and malpresented calves. Lighter calves died more frequently than heavier calves but the incidence of heavy calf dystocia increased in rounds 2 and 3 when the females were supplemented at higher levels due to the season.

Table 5 Calving Performance

Calving year	2002	2003	2004
Av male birth weight	38.4	39.7	37.5
Av heifer birth weight	35.6	36.9	36.3
Birth weight range	20-52	18-57	7-85
No Calves over 40kg	88	118	83
No 40+ kg calf deaths	2	7	10
No lighter calf deaths	7 (4 twins)	8 (3 twins)	11 (5 twins)

It is important to realise that while the averages are useful, they do not tell the whole story. Each bull has quite a range of progeny performance in all traits. Calves are not like peas in a pod. The influence of a sire varies with location, cow age and the cow's genetic contribution. In assessing differences between sires, averages are used to indicate how calves by each sire differ and the difference between the average of a bull's progeny to all the calves in that contemporary group are ht ebasis for calculating EBVs. The amount of range within each group is also of interest. Figure 1 below shows the distribution of birth weights in one sire group.

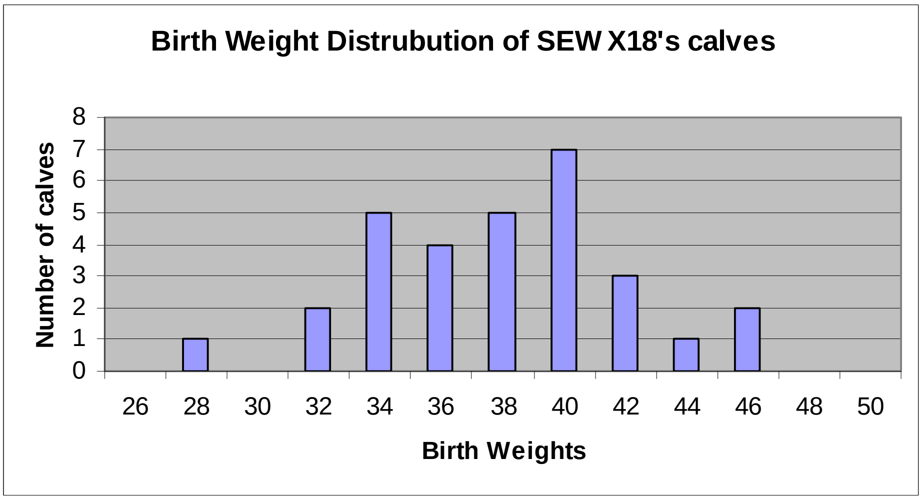

Figure 1 Range of birth weights from a bull's progeny

As seen above, calves by the same sire varied in birth weight from 28 to 46kg with an average of 36.5. This variation occurs for all bulls for all traits. When we select a bull to use, what we aim to do is to move the average of his progeny in one direction or another. If we want to reduce calf birth weight, we use a bull that will reduce the average birth weight of his calves. There will still be individual calves that can be heavy and vice versa.

In tables below, sire birth weight averages are shown for each calving year.

Table 6 Round 1 Birth Weights

Sire	Av Adjusted Birth Weight
Ardrossan New Design V053	37.8
Campbell Farms Emulation V536	37.9
Comfort Hill Stockman U26	37.8
Eastern Plains New Design U5	36
Edi Angus A Rito S8	38.1
Glenavon United U39	36.4
Kennys Creek Tonkin T25	38
Mitta Valley Titan T63	39.3
Moogenilla V22	38.2
Raff Ultimate U27	40.5
Rennylea U214	37
St Pauls Trav-Albert T67	37.2
Wattletop Vibe V86	36.9

Table 7 Round 2 Birth Weights

Sire	Av Adjusted Birth Weight
Five Star Whiskey W6	35.7
Kansas Pied Piper W19	37
Comfort Hill Yellowstone W86	36.3
Eastern Plains Max W7	34.1
Koojan Hills Somethin Special W26	35.8
Rosevale V9	35.2
Kennys Creek Headliner V87	36.9
Twynam Uppercut U85	34.7
Wallaroy Vanguard 2000 V189	36.5
Alumy Creek KM Future Direction W03	35.2
Bald Blair New Design V86	33.1
St Pauls Vampire V51	36.2
Wattletop Wooly W120	33.6

Table 8 Round 3 Birth Weights

Sire	Av Adjusted Birth Weight
Alloura Warrior W06	34.8
Booroomooka Westall W391	36.5
Brumar Vanquish V9	35.5
Hazeldean V113	35.7

Hidden Valley Existence X18	35.4
Hidden Valley Expectation X11	33.5
Lawsons GAR Precision W363	33.6
Strathtay Universe X19	33.8
Witherswood Waterloo W93	35.9
Ythanbrae New Design 036 V429	35
Bald Blair RockN D X63	37.8
Wattletop Future Direction X27	37

In each year, calving losses were due to a range of different causes. Many light weight twin calves died. Many twins required assistance. Some calves were born prematurely, some were malpresented, some required caesarean delivery and others were from easy to hard pulls. This individual sire information on raw calving results is not presented.

DNA Paternity Testing

To ensure the accuracy of progeny test data, all calves were DNA sire verified. Samples were collected at birth or shortly after and tested to confirm that calves were by the sire of record. When this started in 2002, the process was fairly new and large scale calf sampling of this type had rarely been done before. Sire DNA confirmation provided a number of surprises. In the first year of testing, with 398 calves born, nine of the calves that failed paternity tests to the AI sire of record and the natural service cover sire were re tested. In 5 cases, they were from the correct cow but the AI records were incorrect. They were by AI sires but different to the sire recorded. Either the wrong straws were used or the communication and recording introduced errors. It is important to note that in every one of these cases, the sire of record would have been the sire quoted on the pedigree and EBV information.

In another case, the calf failed it's paternity test and on retest, failed the dam test. The cow had stolen another's calf and again the records would be corrupted without DNA testing. In the following two years, when a calf failed the DNA test against it's recorded sire, the calf was first tested against a sample taken from the cow. Most cases of error were explained when this was done. Each year cows walked away with another cow's calf. In some cases this meant that they left their own calf as an orphan, in other cases cows switched calves with one another. In the 2004 calving, four calves were found abandoned. Through DNA testing, all but one of these was resolved.

In 2002, one calf was born that was confirmed to be from its mother of record. After testing to all other AI sires and back-up bulls, its sire was still a mystery. Tests against all other bulls on the Research Centre failed to identify its sire. Immaculate conception does exist.

Before DNA testing was easily done and relatively cheap, breeders used birth dates and sometimes birth weight to help identify calf sires. In circumstances where AI was followed closely by a backup bull, there are always some calves that are hard to tell if they are by the AI or by the backup sire. The experience using DNA testing indicates that there are likely to be many pedigree mistakes unless proper paternity testing is done. Each year of progeny testing, some calves were born up to 2 weeks late and others were born 3 weeks early. Individual sires varied by an average of 5 days in the gestation length of their calves. DNA testing of questionable calves is essential to get accurate pedigrees.

Weaning performance

Tables below present the adjusted weaning weights for each sire's progeny. Adjustments have been made for age of the dam of each animal, for the dam's EBVs, and for different contemporary groups. This attempts to allow one figure to indicate differences in progeny performance due to sire effect with all calves of different sex, different age, different dam age and from different dam merit adjusted to be of similar age, sex, and from similar EBV cows of similar age cows.

All calves were weighed in January and again in March. They were displayed at the annual Trangie field day in April to show the results of the progeny test program. All heifer and steer weaners were penned separately providing a great chance to compare progeny groups. There was some bias in the actual weaning weights for the natural service sires as more of their calves were younger but they all had some early born calves.

Table 9 Round 1 Weaning Weights, weaning 2003

Sire	Av Adjusted 200 Day Weight (Kg)
Ardrossan New Design V053	204.0
Campbell Farms Emulation V536	208.0
Comfort Hill Stockman U26	205.6
Eastern Plains New Design U5	209.8
Edi Angus A Rito S8	214.9
Glenavon United U39	204.9
Kennys Creek Tonkin T25	207.7
Mitta Valley Titan T63	217.0
Moogenilla V22	212.5
Raff Ultimate U27	224.1
Rennylea U214	209.1
St Pauls Trav-Albert T67	208.9
Wattletop Vibe V86	213.4

Table 10 Round 2 Weaning Weights, weaning 2004

Sire	Av Adjusted 200 Day Weight (Kg)
Five Star Whiskey W6	209.5
Kansas Pied Piper W19	208.9
Comfort Hill Yellowstone W86	205.1
Eastern Plains Max W7	198.7
Koojan Hills Somethin Special W26	201.9
Rosevale V9	205.8
Kennys Creek Headliner V87	217.4
Twynam Uppercut U85	204.4
Wallaroy Vanguard 2000 V189	219.4
Alumy Creek KM Future Direction W03	208.8
Bald Blair New Design V86	194.9
St Pauls Vampire V51	213.7
Wattletop Wooly W120	198.4

Table 11 Round 3 Weaning Weights, weaning 2005

Sire	Av Adjusted 200 Day Weight (Kg)
Alloura Warrior W06	212.1
Booroomooka Westall W391	213.7
Brumar Vanquish V9	217.9
Hazeldean V113	229.3
Hidden Valley Existence X18	221.4
Hidden Valley Expectation X11	222.7
Lawsons GAR Precision W363	214.5
Strathtay Universe X19	206.8
Witherswood Waterloo W93	216.4
Ythanbrae New Design 036 V429	220
Bald Blair RockN D X63	220.7
Wattletop Future Direction X27	217.8

Backgrounding

After weaning, steers were grown out to meet feedlot entry weight. In rounds one and two, 65 steers, equally representing all sires, were sent to Rutherglen in Victoria for backgrounding while the remainder were sent to Glen Innes. In the third round, all steers were sent first to Grafton on the NSW north coast until enough pasture was available for them to return to Glen Innes.

Table 12 Backgrounding gain

Calving year	2002 Glen Innes	2002 Rutherglen	2003 Rutherglen	2003 Glen Innes	2004
Steer weaning weights	255	255	251	251	239
Weight at start of backgrounding	294	278	285.3	271.6	285
Date end backgrounding	28-10-03	6-11-03	3-11-04	2-11-04	9-12-05
Weight	441	499	443.1	381	408.7
Daily gain during backgrounding	0.8	1.36	1.08	0.7	0.6

Again the adjusted weights 400 day weights below are adjusted for age of animal, sex, age of dam and for dam EBV and were recorded at the end of the backgrounding period.

Table 13 Round 1, 400 Day Weights

Sire	Av Adjusted weight
Ardrossan New Design V053	428.6
Campbell Farms Emulation V536	423.6
Comfort Hill Stockman U26	415.9
Eastern Plains New Design U5	411.4
Edi Angus A Rito S8	428.5
Glenavon United U39	414.3
Kennys Creek Tonkin T25	413.0
Mitta Valley Titan T63	425.7

Moogenilla V22	407.7
Raff Ultimate U27	450.4
Rennylea U214	409.7
St Pauls Trav-Albert T67	414.2
Wattletop Vibe V86	428.4

Table 14 Round 2, 400 Day Weights

Sire	Av Adjusted Weight
Five Star Whiskey W6	352
Kansas Pied Piper W19	347.2
Comfort Hill Yellowstone W86	344.0
Eastern Plains Max W7	329.6
Koojan Hills Somethin Special W26	343.5
Rosevale V9	341.4
Kennys Creek Headliner V87	360.5
Twynam Uppercut U85	339.5
Wallaroy Vanguard 2000 V189	366.8
Alumy Creek KM Future Direction W03	336.9
Bald Blair New Design V86	330.1
St Pauls Vampire V51	353.7
Wattletop Wooly W120	350.7

Table 15 Round 3, 400 Day Weights

Sire	Av Adjusted Weight
Alloura Warrior W06	318.2
Booroomooka Westall W391	337.4
Brumar Vanquish V9	319.4
Hazeldean V113	338.5
Hidden Valley Existence X18	331.5
Hidden Valley Expectation X11	341.1
Lawsons GAR Precision W363	319.3
Strathtay Universe X19	323.4
Witherswood Waterloo W93	336.5
Ythanbrae New Design 036 V429	342.7
Bald Blair RockN D X63	335.2
Wattletop Future Direction X27	329.3

Feed Efficiency Testing and Feedlot Growth

After backgrounding, a representative number of steers from each sire were inducted to a feedlot with equipment to measure individual animal feed intake. Round 1 steers were backgrounded and then fed at both Rutherglen in Victoria and at Tullimba in NSW. In this year, Tullimba did not have enough capacity to feed all the steers. Round 2 steers that were again backgrounded at Rutherglen and Glen Innes but were both moved to Tullimba for feeding.

The steers were inducted (treated for parasites, tagged, weighed and vaccinated) and started on feed. Once they were eating the mixed ration, the steers were introduced to the specialised Net Feed Intake (NFI) pens. These facilities hold 10 to 15 steers and have a feeder which measures when an animal eats and how much they eat. An introductory period of 20 days is used to get the steers accustomed to using the feeders and eating the standardised ration. The actual feed test then is done over a 70 day test period. During this time, all animal consumption is measured and the results tabulated.

NFI measures how much more or less an animal eats for its weight and performance. Individual animal feed consumption is compared against how much an average animal of that weight, gaining at that level would be expected to consume. An efficient animal eats less than expected, a less efficient animal eats more than expected. This allows animals to be selected for efficiency independent of weight or performance.

After the conclusion of NFI testing, the steers were returned to normal feedlot troughs to finish 150 days on feed before slaughter. The performance on feed is shown in table 16, below. In round 1, the steers from Rutherglen had done extremely well during backgrounding and were in more forward condition, hence the lower performance on feed. In round 2, the steers from Rutherglen started on feed 50kg heavier and later than the Glen Innes group which were fed longer for a similar slaughter date. The third round steers performed very well on feed, reflecting the tougher time they had after weaning and in the early backgrounding phase.

Table 16 Steer feedlot performance

Calving year / treatment	2002 Backgrounded Glen Innes, fed Tullimba	2002 Backgrounded Rutherglen, fed Rutherglen	2003 Backgrounded Rutherglen, fed Tullimba	2003 Backgrounded Glen Innes, fed Tullimba	2004 Backgrounded, Grafton/Glen Innes, fed Tullimba
Feedlot entry wt	441	499	433.5	381.4	381
Final Feedlot Wt	685.2	713.6	654.3	628.6	632.7
Feedlot Gain	244.2	214.6	220.8	247.2	251.7
No Days on feed	150	150	156	170	151
Av gain/day	1.63	1.43	1.42	1.45	1.67

Details of feed efficiency testing have been interesting. All steers and heifers were tested for the IGF-1 blood hormone before weaning at Trangie. The AEPT steers were bled a number of times for IGF-1, at weaning, at the end of backgrounding and some at the end of feedlot testing. By the time the steers started their NFI test, they had results from the IGF-1 process.

NFI testing is an expensive process. Over the 3 rounds of steers, costs of NFI feeding were around $500 each. In addition, the extra feeding to take steers through to 150 days minimum on feed added another $200 / head or $3.20 per steer per day.

Results from the NFI test are shown below. The columns show the starting and finish weight on test, the gain on test, the average daily gain on test, daily feed intake, net feed intake compared to daily intake expected, adjusted feed intake where the average of this test group is set as 0.

Table 17 NFI for Rutherglen test 2004

Sire ID	Progeny /Sire	Start Wt.	Final Wt.	Total Weight Gain (kg)	ADG (kg/day)	Daily Feed Intake (kg)	Net Feed Intake	Adjusted Net Feed Intake	Rutherglen Rank
BBAU26	4	506	593	87	1.3	14.1	-0.4	0	7
BWFV22	5	518	593	75	1.1	14.2	-0.1	0.3	9
CDJT63	5	561	618	57	0.8	14	-0.7	-0.3	3
CMFS8	5	519	609	91	1.3	13.5	-1.3	-0.9	2
NAQV53	5	556	635	78	1.1	14.6	-0.6	-0.2	5
NDIT25	5	551	621	69	1	15.4	0.5	0.9	12
NEPU5	4	503	582	79	1.1	13.5	-0.6	-0.2	5
NFWU39	4	501	581	81	1.2	13.7	-0.4	0	7
NORU214	5	546	629	82	1.2	15.7	0.6	1	13
NSTT67	5	542	608	66	1	15	0.4	0.8	11
NWPV86	5	515	590	75	1.1	13.5	-0.7	-0.3	3
QRFU27	5	619	696	77	1.1	16.7	0.2	0.6	10
VVXV536	5	552	623	71	1	12.9	-2	-1.6	1

Steers tested at Tullimba went through a similar process. Results in ranking the performance of feed efficiency by sire are remarkably similar with one exception. They are not exactly the same as there are only small numbers per sire in each test site and the mothers of individual calves in this small a sample can have a big effect. In calculating NFI EBVS, both these factors are taken into account. Their results are shown below.

Table 18 NFI for Tullimba test 2004

Sire ID	Progeny / Sire	Start Wt.	Final Wt.	Total Weight Gain (kg)	ADG (kg/day)	Daily Feed Intake (kg)	Net Feed Intake	Adjusted Net Feed Intake	Tullimba Rank
BBAU26	3	532	616	84	1.11	13.6	-1.1	0.107	8
BWFV22	5	565	645	80	1.07	14.3	-1.07	0.142	9
CDJT63	5	599	692	93	1.23	14.0	-2.33	-1.124	1
CMFS8	5	600	698	98	1.32	15.2	-1.32	-0.11	7
NAQV53	6	575	665	90	1.20	15.6	-0.19	1.025	13
NDIT25	6	586	676	90	1.20	15.7	-0.34	0.867	12
NEPU5	4	551	645	94	1.26	15.0	-0.4	0.8.8	11
NFWU39	5	574	661	87	1.17	14.5	-1.33	-0.12	6
NORU214	3	588	698	110	1.47	15.0	-1.58	-0.367	4
NSTT67	5	575	668	93	1.24	15.2	-0.71	0.496	10
NWPV86	6	572	663	91	1.21	14.1	-1.7	-0.491	3
QRFU27	6	593	695	102	1.35	14.9	-1.56	-0.383	5
VVXV536	7	548	629	81	1.08	13.0	-1.99	-0.78	2

In the second round of NFI testing, steer weaners were again split with 65 going to Rutherglen for backgrounding but those steers were subsequently returned to Tullimba for NFI testing. Thus there are two management groups reported separately. Again, except for a few sire progeny groups, the ranking on sires on NFI has been similar.

Table 19 NFI Test Results, Tullimba, 2005

Sire ID	Group	Progeny /sire	Start Wt	End Wt	ADG	Daily Feed Intake	Net Feed Intake	Adj NFI	Rank in gp
BBA W86	Rutherglen	5	543.4	645	1.47	14.16	-1.47	-0.76	2
BBA W86	Glen Innes	5	474.8	564.8	1.3	14.47	0.63	-0.35	2
BGX W006	Rutherglen	4	559.8	651.3	1.33	14.82	-0.85	-0.14	7
BGX W006	Glen Innes	4	482.5	598.8	1.69	15.72	0.93	-0.05	7
NBB V86	Rutherglen	5	477	557.6	1.17	11.92	-1.7	-0.99	1
NBB V86	Glen Innes	4	439	544.3	1.53	13.88	0.35	-0.63	1
NDI V87	Rutherglen	5	523	614.6	1.33	14.69	-0.23	0.48	10
NDI V87	Glen Innes	4	512	623.5	1.62	16.69	1.43	0.45	11
NED V189	Rutherglen	5	564.8	662.6	1.42	15.82	-0.15	0.56	11
NED V189	Glen Innes	7	501.1	622.6	1.76	16.71	1.38	0.4	10
NKE W03	Rutherglen	5	493.8	595.2	1.47	14.89	0.3	1.01	12
NKE W03	Glen Innes	4	457	571.3	1.66	15.01	0.83	-0.15	6
NKL W19	Rutherglen	4	545	651.5	1.55	14.86	-0.95	-0.24	6
NKL W19	Glen Innes	8	499.3	597.8	1.43	15.74	1.12	0.14	9
NQM V9	Rutherglen	4	538.8	637.8	1.43	14.47	-0.98	-0.27	4
NQM V9	Glen Innes	8	465.3	568.6	1.5	15.5	1.44	0.46	12
NST V51	Rutherglen	5	543.2	645.8	1.49	15.25	-0.4	0.31	8
NST V51	Glen Innes	8	473	577.9	1.52	15.05	0.79	-0.19	4
NWP W120	Rutherglen	5	545.8	644.6	1.43	14.61	-0.99	-0.29	3
NWP W120	Glen Innes	8	495.8	586.1	1.34	15.17	0.81	-0.17	5
NXT U85	Rutherglen	4	515	594.5	1.15	13.41	-0.98	-0.27	4
NXT U85	Glen Innes	8	457.1	558.3	1.47	14.9	1.1	0.12	8
WKH W26	Rutherglen	5	485.2	581.2	1.39	13.92	-0.32	0.39	9
WKH W26	Glen Innes	8	495.6	599.1	1.5	15.4	0.71	-0.27	3

In the third round of feed efficiency testing, all steers inducted into the feedlot were successfully admitted to the test yards. Numbers of progeny per sire were higher and the results similar in range to previous years.

Table 20 NFI Test Results, Tullimba, 2006

Sire ID	Progeny /sire	Start Wt	End Wt	ADG	Daily Feed Intake	Net Feed Intake	Adj NFI	Rank in group
CWJW93	12	496.9	607.6	1.6	14.25	-0.67	-0.29	3
DGJW06	12	477.6	587.6	1.59	14.16	-0.33	0.05	8
NBB X63	12	476.2	581.5	1.53	13.98	-0.35	0.03	7
NGMW391	12	517.8	639.6	1.76	15.96	0.26	0.66	12
NHZ V113	12	498	615.8	1.71	15.06	-0.10	0.28	10
NWP X27	7	472.4	573.9	1.47	13.49	-0.64	-0.26	4
SEW X11	12	497.6	601.5	1.51	14.81	0.06	0.44	11
SEW X18	12	503.3	614.8	1.61	14.62	-0.45	-0.07	6
VLY V429	12	519.2	624.8	1.53	14.75	-0.49	-0.11	5
VLY W363	9	479.2	591.1	1.62	13.66	-0.93	-0.55	2
WJY X19	12	460	563.8	1.5	12.94	-1.00	-0.62	1
WMC V9	12	492.4	604.9	1.63	14.64	-0.24	0.14	9

Australia leads the world in feed efficiency testing. How much animals eat to grow and perform is essential to economic beef production. Animals that don't eat as much yet perform well are highly desirable. This area of cattle production is not well understood, by scientists and cattle breeders alike. Feed efficiency testing is a very expensive activity and new research that indicates that performance after weaning may be a different trait adds to this challenge. The AEPT testing tested feedlot efficiency. Steers were grown out to feedlot entry weights and then put on feed. This is what the feedlots do so it becomes important to the industry that more efficient animals, particularly breeding animals are identified.

What we now recognise is that there are a number of different stages in the efficiency picture. We need efficiency of growth, of finishing and of cow maintenance and production. NFI testing at either weaning age or feedlot finishing now appear to be different traits. How these relate to cow efficiency is still to be accurately determined. IGF-1 was seen as a low cost method of measuring feed efficiency. This now appears to be less useful than previously expected. The loss of an inexpensive test for feed efficiency using IGF-1 is a big disappointment. The AEPT data using actual feedlot NFI measurement gives an important perspective to the progeny test bulls not available through other systems. This has identified bulls that are efficient as well as having other desirable traits for growth, female productivity and carcase value.

The tables below give the 600 day adjusted weights. These combine the 600 day weights of both heifers and steers.

Table 21 Round 1, 600 Day Weights

Sire	Av Adjusted weight
Ardrossan New Design V053	631.8
Campbell Farms Emulation V536	617
Comfort Hill Stockman U26	617
Eastern Plains New Design U5	599.9
Edi Angus A Rito S8	626.8
Glenavon United U39	604.5
Kennys Creek Tonkin T25	615.5
Mitta Valley Titan T63	621.7
Moogenilla V22	595.9
Raff Ultimate U27	662
Rennylea U214	620.1
St Pauls Trav-Albert T67	622.9
Wattletop Vibe V86	627.4

Table 22 Round 2, 600 Day Weights

Sire	Av Adjusted Weight
Five Star Whiskey W6	553
Kansas Pied Piper W19	552.2
Comfort Hill Yellowstone W86	543.5
Eastern Plains Max W7	522.1
Koojan Hills Somethin Special W26	544
Rosevale V9	537.2
Kennys Creek Headliner V87	561.6
Twynam Uppercut U85	528.4
Wallaroy Vanguard 2000 V189	562
Alumy Creek KM Future Direction W03	533.7
Bald Blair New Design V86	520.7
St Pauls Vampire V51	543.7
Wattletop Wooly W120	535.6

Table 23 Round 3, 600 Day Weights

Sire	Av Adjusted Weight
Alloura Warrior W06	490
Booroomooka Westall W391	517.7
Brumar Vanquish V9	490.4
Hazeldean V113	514.1
Hidden Valley Existence X18	511.4
Hidden Valley Expectation X11	503.8
Lawsons GAR Precision W363	487.3
Strathtay Universe X19	488.4
Witherswood Waterloo W93	498.8
Ythanbrae New Design 036 V429	519.7
Bald Blair RockN D X63	502.4
Wattletop Future Direction X27	499.4

Steer Slaughter

Steers were slaughtered in two different plants in 2004, 2005 and 2006. Each year, the steers were offered to a number of interested parties and pre sold on a grid basis. Pre selling allowed fixing of slaughter times and prices. Tenders were called in each year and the best tender for total price accepted. In 2004 the cattle were sold to John Dee Pty Ltd at Warwick in Queensland, in 2005 to AMH Beef City and in 2006 to John Dee Pty Ltd. In all cases, steers arrived at the abattoir the day before slaughter and were slaughtered, kill data collected and then chilled before MSA grading of carcases the following morning. In 2004 and 2005, we employed an MSA grader to conduct the grading and in 2006 a company accredited MSA grader provided the data. All carcase data was reported to Angus Group Breedplan for analysis.

Average kill data for each group is shown below with the range of each measure shown in brackets:

Table 24 Slaughter data summary

Calving year	Calving 2002, slaughter 2004	Calving 2003, slaughter 2005	Calving 2004, slaughter 2006
Av Carcase Wt (kg)	Rutherglen 399.6 (348-489) Tullimba 383.7 (334-455)	349.8 (290-419)	353 (294-420)
Av P8 fat	Rutherglen 22.1 (11-36) Tullimba 20.6 (12-32)	19.2 (9-29)	17.8 (10-35)
Av EMA	Rutherglen 76.9 (60-97) Tullimba 82.2 (71-94)	73.8 (59-87)	75.6 (62-95)
Av Ausmeat Marble Score	Rutherglen 1.93 (0.7-4.2) Tullimba 1.7 (0.8-3.1)	1.93 (0-3.6)	1.7 (1-3.2)

Table 21 gives raw carcase data. Breedplan uses carcase data corrected to standard age for carcase weight (650 days) and a standard 300 kg carcase weight. The adjusted averages for carcase weight, P8 fat and EMA are given below for each sire for each year. The marble score shown is an average raw marble score for each sire. This is converted to IMF% for Breedplan analysis.

Table 25 Round 1 Carcase Data

Sire	Av Adjusted HSCW	Av Adjusted P8 fat	Av Adjusted EMA	Av MSA Marble Score
Ardrossan New Design V053	417.75	16.5	65.2	1.59
Campbell Farms Emulation V536	390	17.1	61.7	1.89
Comfort Hill Stockman U26	388.9	16.6	63.9	1.93
Eastern Plains New Design U5	381	15.7	60.6	1.39
Edi Angus A Rito S8	412	15.6	64.1	1.87
Glenavon United U39	382.9	15.4	64.0	1.78
Kennys Creek Tonkin T25	400.3	19.5	62.8	1.83
Mitta Valley Titan T63	400.4	19.2	63.9	1.48
Moogenilla V22	383.2	18	58.9	1.75
Raff Ultimate U27	407.3	19.5	60.8	1.85
Rennylea U214	413	18.4	60.8	2.11
St Pauls Trav-Albert T67	401.1	20	61.2	1.86
Wattletop Vibe V86	401.5	18	64.1	1.83

Table 26 Round 2 Carcase Data

Sire	Av Adjusted HSCW	Av Adjusted P8 fat	Av Adjusted EMA	Av MSA Marble Score
Five Star Whiskey W6	353.2	15.3	61.3	2.02
Kansas Pied Piper W19	354.3	15.8	65.3	2.25
Comfort Hill Yellowstone W86	339.4	15.3	67.9	1.92
Eastern Plains Max W7	327.4	19.8	64.3	1.06
Koojan Hills Somethin Special W26	345.9	19.7	65.1	1.34
Rosevale V9	349.2	18	66.1	1.98
Kennys Creek Headliner V87	337	19.5	62.8	1.47
Twynam Uppercut U85	334.4	14.1	68.2	1.75
Wallaroy Vanguard 2000 V189	362.5	16.5	64.9	2.08
Alumy Creek KM Future Direction W03	339.7	19.1	68.5	2.02
Bald Blair New Design V86	322.3	18.6	69.4	2.42
St Pauls Vampire V51	335.8	16.5	63.7	1.78
Wattletop Wooly W120	342.1	16.3	62.1	2.48

Data from Round 3 slaughter is not currently being used in Breedplan. The data was included in the June 2006 analysis but some concerns regarding the data were raised. As a result, the data was removed pending a decision on it's integrity and what data should be returned to the system. For that reason, carcase EBVs for Round 3 do not include the progeny test results. The figures below are the adjusted averages using the carcase results.

Table 27 Round 3 Carcase Data

Sire	Av Adjusted HSCW	Av Adjusted P8 fat	Av Adjusted EMA	Av MSA Marble Score
Alloura Warrior W06	346.5	18.8	62.5	1.55
Booroomooka Westall W391	380.2	14.9	62.4	2.08
Brumar Vanquish V9	350.8	16.4	62.7	1.92
Hazeldean V113	374.4	16.6	58.3	1.76
Hidden Valley Existence X18	362.8	15.5	61.9	1.48
Hidden Valley Expectation X11	360.1	17.4	58.4	1.49
Lawsons GAR Precision W363	361.4	13.7	61.1	1.51
Strathtay Universe X19	337	17.7	63.8	1.49
Witherswood Waterloo W93	365.5	15.4	56.5	2.57
Ythanbrae New Design 036 V429	364.7	17.0	54.3	1.72
Bald Blair RockN D X63	362.1	15.7	60.5	1.32
Wattletop Future Direction X27	348.3	17.9	63.1	1.77

Feedlot Feedback

If the progeny test steers had been finished in a commercial feedlot, feedback information on feedlot performance and carcase results would be reported. The following tables give standard feedlot summaries for each sire group using raw figures. These raw figures differ from some of the adjusted figures shown above and the differences are important. These raw figures do not correct for age so the natural service sires have more of the younger calves in their sire groups, hence lower averages that other bulls. The raw figures are not brought to a standard carcase weight or age as in the figures in tables above.

Table 28 Round 1 Feedlot Performance by sire lot

Sire	Feedlot entry wt	Final Wt	Daily gain	Carcase Wt	P8 Fat	MSA Marble score	Carcase Value
Ardrossan New Design V053	467.3	740.9	1.72	400.1	19.7	1.59	$1491
Campbell Farms Emulation V536	468.3	710.4	1.53	383.6	22.3	1.88	$1460
Comfort Hill Stockman U26	444.1	692	1.57	373.7	18.9	2.04	$1408
Eastern Plains New Design U5	458	691	1.47	372.9	18.4	1.26	$1436
Edi Angus A Rito S8	475.5	747.2	1.71	403.5	18.8	1.88	$1542
Glenavon United U39	463.6	696.1	1.46	375.9	18.1	1.79	$1442
Kennys Creek Tonkin T25	467.3	729.2	1.65	393.8	23.8	1.81	$1516
Mitta Valley Titan T63	492.2	725.3	1.47	391.7	23.9	1.48	$1433
Moogenilla V22	456.5	693.6	1.49	374.5	21.3	1.75	$1416
Raff Ultimate U27	501.2	781.3	1.76	421.9	22.3	1.75	$1564
Rennylea U214	471.2	750.6	1.76	405.3	22.4	2.16	$1545
St Pauls Trav-Albert T67	468.5	726.8	1.63	392.5	24.4	2.09	$1493
Wattletop Vibe V86	459.7	708.9	1.57	382.8	21.3	1.82	$1397
Group Average	469.8	723.5	1.59	388.3	21.1	1.80	$1475

Table 29 Round 2 Feedlot Performance by sire lot

Sire	Feedlot entry wt	Final Wt	Daily gain	Carcase Wt	P8 Fat	MSA Marble score	Carcase Value
Five Star Whiskey W6	426.6	642.8	1.69	364.9	18.9	2.02	$1482
Kansas Pied Piper W19	410.2	641.6	1.77	366.2	18.2	2.25	$1517
Comfort Hill Yellowstone W86	412.6	627.8	1.63	347.6	17.2	1.92	$1400
Eastern Plains Max W7	401.2	595.2	1.63	332.30	21.0	1.28	$1308
Koojan Hills Somethin Special W26	392.2	613.7	1.68	348.5	22.3	1.34	$1347
Rosevale V9	398.9	618.8	1.65	347.9	20.7	1.98	$1396
Kennys Creek Headliner V87	418.2	636.3	1.71	356.2	22.6	1.47	$1378
Twynam Uppercut U85	388.0	597.6	1.55	333.0	14.9	1.75	$1347
Wallaroy Vanguard 2000 V189	427.5	659.5	1.77	370.1	19.2	2.08	$1496
Alumy Creek KM Future Direction W03	386.2	610.3	1.68	343.0	21.0	2.02	$1386
Bald Blair New Design V86	379.8	579.7	1.5	318.3	20.3	2.42	$1336
St Pauls Vampire V51	404.8	616.8	1.65	346.5	18.3	1.76	$1376
Wattletop Wooly W120	418.6	631.8	1.62	356.2	17.5	2.48	$1488
Group Average	405.3	621.3	1.62	349.8	19.2	1.93	$1411

Table 30 Round 3 Feedlot Performance by sire lot

Sire	Feedlot entry wt	Final Wt	Daily gain	Carcase Wt	P8 Fat	MSA Marble score	Carcase Value
Alloura Warrior W06	366.7	618.2	1.67	346.2	20.0	1.55	1385
Booroomooka Westall W391	396.5	675.5	1.85	378.3	17.4	2.08	1545
Brumar Vanquish V9	372.3	621.2	1.65	348.1	17.3	1.92	1394
Hazeldean V113	379.3	647.0	1.77	362.3	18.2	1.76	1485
Hidden Valley Existence X18	384.0	640.0	1.69	358.4	16.3	1.48	1462
Hidden Valley Expectation X11	391.2	631.8	1.59	353.8	18.5	1.49	1443
Lawsons GAR Precision W363	377.4	638.2	1.72	357.4	14.4	1.51	1462
Strathtay Universe X19	363.5	594.3	1.53	332.8	18.5	1.49	1335
Witherswood Waterloo W93	393.7	640.2	1.63	358.5	17.2	2.57	1433
Ythanbrae New Design 036 V429	400.7	650.2	1.65	364.1	19.5	1.72	1489
Bald Blair RockN D X63	373.3	623.0	1.65	348.9	16.8	1.32	1420
Wattletop Future Direction X27	374.0	603.8	1.52	338.1	17.7	1.77	1373
Group Average	381.2	632.7	1.67	354.3	17.8	1.70	1437

The prices quoted above are not constant from year to year. Each year a different grid was used with different prices based on current conditions.

In the second year of steer slaughter, steers were sold on carcase weight with a base price set for carcases with Marble Score 0 or 1. Carcases with Marble Score 2 received a Marble Bonus of 40c/kg HSCW and those with Marble Score 3 received a Marble Bonus of 60c/kg HSCW. This provides an interesting perspective on the value of marbling to the total carcase value. This formula has been applied to the three years of steer slaughter in the tables below.

Table 31 Round 1 Marbling Bonus

Sire	Carcase Wt	Carcase value	Works Marble score	Average Marble Bonus	Full Carcase Value
Ardrossan New Design V053	400.1	$1478	1.17	16.7	$1548
Campbell Farms Emulation V536	383.6	$1428	1.58	26.6	$1532
Comfort Hill Stockman U26	373.7	$1415	1.50	29.5c	$1523
Eastern Plains New Design U5	372.9	$1414	1.63	30	$1527
Edi Angus A Rito S8	403.5	$1482	1.58	25c	$1585
Glenavon United U39	375.9	$1414	1.58	24.6	$1506
Kennys Creek Tonkin T25	393.8	$1490	1.67	25c	$1588
Mitta Valley Titan T63	391.7	$1433	1.30	16.5c	$1535
Moogenilla V22	374.5	$1416	1.75	28.3c	$1522
Raff Ultimate U27	421.9	$1510	1.67	28.3	$1629
Rennylea U214	405.3	$1481	1.82	23.6	$1579
St Pauls Trav-Albert T67	392.5	$1491	1.90	34.5	$1631
Wattletop Vibe V86	382.8	$1430	1.83	32.5	$1556
Group Average	388.3	$1475	1.80	25.5	$1547

Table 32 Round 2 Marbling Bonus

Sire	Carcase Wt	Carcase value	Works Marble score	Average Marble Bonus	Full Carcase Value
Five Star Whiskey W6	364.9	$1384	2.02	26.7c	$1482
Kansas Pied Piper W19	366.2	$1387	2.25	35.4c	$1517
Comfort Hill Yellowstone W86	347.6	$1317	1.92	24c	$1400
Eastern Plains Max W7	332.30	$1256	1.28	16c	$1308
Koojan Hills Somethin Special W26	348.5	$1314	1.34	9.2c	$1347
Rosevale V9	347.9	$1316	1.98	23.1c	$1396
Kennys Creek Headliner V87	356.2	$1345	1.47	8.9c	$1378
Twynam Uppercut U85	333.0	$1246	1.75	24.6c	$1347
Wallaroy Vanguard 2000 V189	370.1	$1405	2.08	24.6c	$1496
Alumy Creek KM Future Direction W03	343.0	$1294	2.02	26.7c	$1386
Bald Blair New Design V86	318.3	$1204	2.42	42.2c	$1336
St Pauls Vampire V51	346.5	$1308	1.78	18.5c	$1376
Wattletop Wooly W120	356.2	$1351	2.48	38.5c	$1488
Group Average	349.8	$1324	1.93	24.8c	$1411

Table 33 Round 3 Marbling Bonus

Sire	Carcase Wt	Carcase value	Works Marble score	Average Marble Bonus	Full Carcase Value
Alloura Warrior W06	346.2	$1307	1.55	14c	$1354
Booroomooka Westall W391	378.3	$1423	2.08	22c	$1506
Brumar Vanquish V9	348.1	$1321	1.92	23c	$1403
Hazeldean V113	362.3	$1373	1.76	18c	$1440
Hidden Valley Existence X18	358.4	$1359	1.48	12c	$1402
Hidden Valley Expectation X11	353.8	$1340	1.49	13c	$1387
Lawsons GAR Precision W363	357.4	$1358	1.51	11c	$1397
Strathtay Universe X19	332.8	$1262	1.49	17	$1315
Witherswood Waterloo W93	358.5	$1345	2.57	46c	$1493
Ythanbrae New Design 036 V429	364.1	$1375	1.72	22c	$1456
Bald Blair RockN D X63	348.9	$1324	1.32	6c	1344
Wattletop Future Direction X27	338.1	$1282	1.77	11c	$1320
Group Average	354.3	$1341	1.70	18c	$1404

These marbling bonus figures add an extra dimension to the tables reported on adjusted averages. These tables, with limitations of raw figures, report on the commercial carcase value for each sire's progeny. Carcases are more valuable if they are heavier and earn more return from that greater carcase weight or they have more marbling and earn more per kg sold. In the examples above, both sides of the equation apply. Some sires have heavy carcases, some have highly marbled carcases that under this price schedule, earn more than heavier carcases because of the extra price/kg that they receive. The real winners are the ones that are heavy carcase weights and also heavily marbled. These traits are reflected in Breedplan $Indexes for the marbled markets.

Female Growth and Joining

After weaning, all heifers from all years were grown out to joining time as yearlings in November. All heifers except twins, orphans or with no confirmed pedigree were joined using paddock mating to yearling or two year old bulls. Bulls were selected to be around breed average on Birth Weight EBVs and of suitable structure for heifer joining. Heifers were joined for 9 weeks and were pregnancy tested in late January. Empty heifers were culled and from the pregnant heifers, 100 were retained to calve down and to enter the Trangie herd. Selection of the heifers to be kept was done to ensure equal representation of each sire. The retained heifers were run through to calving, calved with calving data and calf birthweight recorded. They were then rejoined and further records of calf performance collected. By the end of 2006, the 2002 drop "X" females have had the chance to deliver 3 calves, the 2003 drop "Y" females 2 calves and the 2004 drop "Z" heifers their first calf.

Details of joining and first calving results are shown below:

Table 34 Round 1 heifer joining and calving results for first calving

Sire	No Joined	No Preg	No Selected	No Calves
Ardrossan New Design V053	13	9	7	6
Campbell Farms Emulation V536	12	10	8	7
Comfort Hill Stockman U26	16	14	7	7
Eastern Plains New Design U5	17	13	8	5
Edi Angus A Rito S8	11	11	7	7
Glenavon United U39	11	10	8	8
Kennys Creek Tonkin T25	13	12	8	7
Mitta Valley Titan T63	19	12	8	8
Moogenilla V22	13	9	6	6
Raff Ultimate U27	14	12	8	7
Rennylea U214	15	14	8	8
St Pauls Trav-Albert T67	10	9	8	8
Wattletop Vibe V86	25	22	8	7

Table 35 Round 2 heifer joining and calving results for first calving

Sire	No Joined	No Preg	No Selected	No Calves
Five Star Whiskey W6	18	16	10	4
Kansas Pied Piper W19	6	5	5	4
Comfort Hill Yellowstone W86	12	9	7	5
Eastern Plains Max W7	14	14	5	5
Koojan Hills Somethin Special W26	12	8	7	6
Rosevale V9	16	13	12	5
Kennys Creek Headliner V87	12	11	10	6
Twynam Uppercut U85	11	8	7	4
Wallaroy Vanguard 2000 V189	10	7	6	5
Alumy Creek KM Future Direction W03	11	9	8	6
Bald Blair New Design V86	17	13	10	9
St Pauls Vampire V51	13	9	8	3
Wattletop Wooly W120	10	7	7	6

Table 36 Round 3 heifer joining and calving results for first calving

Sire	No Joined	No Preg	No Selected	No Calves
Alloura Warrior W06	14	12	9	7
Booroomooka Westall W391	12	9	8	7
Brumar Vanquish V9	13	11	10	8
Hazeldean V113	13	10	9	7
Hidden Valley Existence X18	12	11	10	5
Hidden Valley Expectation X11	8	8	7	5
Lawsons GAR Precision W363	17	14	10	9
Strathtay Universe X19	7	4	3	1
Witherswood Waterloo W93	13	10	9	7
Ythanbrae New Design 036 V429	10	9	9	8
Bald Blair RockN D X63	19	16	10	7
Wattletop Future Direction X27	10	9	8	6

These results are the most disappointing of the entire progeny test program. Too many females were selected as PTIC females yet failed to deliver calves. No real reason for the failure to calve has been determined. Either the pregnancy diagnosis was wrong or too many of the PTIC females lost calves with no observation of that occurring. Dead calves were reported but for others, no obvious slipping of calves occurred yet we lost too many pregnancies. These results meant that much of the fertility data is missing and that even structural scores for udder traits were lost.

Structural Scoring

Each calf drop was scored for structure using the BeefClass Scoring System. This scores animals for feet and leg shape, visual fat score, capacity and visual muscle score. Details are included as Appendix 1. Scores range from 1 to 9 with ideal for each trait being 5. For example, front foot angle ranges from being long with weak pastern (higher scores) to very upright and blocky (lower scores). In Angus cattle, most have some degree of curl to the front claws. Hereford cattle tend to be longer and lower in foot angle with European breeds tending to be more upright in foot angle with straighter pasterns. This helps explain that not many animals will receive ideal scores and the sire averages below look at differences between sires rather than the actual values.

Steers were scored prior to slaughter towards the end of their feedlot finishing at nearly 2 years of age. Heifers were scored after joining and pregnancy testing and before numbers were reduced. The heifers were then 18 months of age. Repeat scores were made on females with calves at foot to give udder scores but the number per sire of lactating females were very erratic from year to year so no summary of them is included here.

The tables below shows the average score for each trait. As the steers in some years were separated at weaning with nearly half going to Rutherglen in Victoria on soft country and the other half grown out on foot wearing granite soil at Glen Innes, there are slight differences in the feet scores between both locations indicated at location averages. For simplicity, because each sire had roughly the same number of steers in each group, the scores have been combined except for the averages from each location at the bottom of the first table. This difference in environment is again highlighted when the heifer average scores are compared to the steers. On very soft black soil at Trangie, the heifer feet tend to be longer with more curl.

Table 37 Round 1 Steer Scores

Sire	Front Feet Claw Set	Rear Feet Claw Set	Front Feet Angle	Rear Feet Angle	Rear Leg Side View	Rear Leg Hind View	Fat Score	Capacity	Muscle Score
BBA U26	6.4	6.0	5.5	6.0	5.8	5.4	3.8	3.1	7.8
BWF V22	6.7	5.9	5.8	6.5	5.8	5.1	4.2	3.4	8.3
CDJ T63	7.0	6.2	6.0	6.3	5.4	5.2	4.1	3.4	8.1
CMF S8	6.5	6.0	5.9	5.8	5.5	5.3	4.3	3.4	8.2
NAQ V53	6.5	6.0	5.8	6.1	5.3	5.2	3.8	3.4	8.4
NDI T25	6.8	5.9	5.8	6.5	5.8	5.5	4.1	3.4	8.0
NEP U5	6.4	6.4	6.1	5.9	5.0	5.3	4.3	3.6	8.5
NFW U39	6.3	5.6	5.5	6.4	5.5	5.5	4.2	3.5	7.5
NOR U214	6.7	6.0	5.6	6.1	5.6	5.6	3.9	3.5	8.0
NST T67	6.5	6.2	5.5	6.0	5.3	5.8	4.5	3.4	8.1
NWP V86	6.2	5.8	5.7	5.8	5.1	5.5	4.3	3.4	7.9
QRF U27	6.6	5.7	5.2	5.6	4.9	5.3	3.8	3.5	7.6
VVX V536	6.3	5.8	5.4	5.7	5.8	5.8	3.9	3.3	8.3
Tullimba Av	6.44	5.85	5.52	6.11	5.43	5.46	3.99	3.44	8.05
Rutherglen Av	6.61	6.05	5.84	5.98	5.44	5.38	4.20	3.37	8.03
Total Av	6.52	5.94	5.66	6.06	5.43	5.42	4.08	3.41	8.04

Table 38 Round 1 Heifer Scores

Sire	Front Feet Claw Set	Rear Feet Claw Set	Front Feet Angle	Rear Feet Angle	Rear Leg Side View	Rear Leg Hind View	Fat Score	Capacity
BBA U26	6.6	5.8	6.0	6.1	5.1	5.3	3.0	3.0
BWF V22	7.3	6.4	6.4	7.0	5.6	5.4	3.2	2.9
CDJ T63	7.4	6.2	6.3	6.5	4.9	5.1	3.3	3.1
CMF S8	7.6	6.2	6.5	6.5	5.1	5.4	3.2	3.2
NAQ V53	6.8	6.6	6.0	6.5	5.9	5.6	3.2	2.6
NDI T25	6.9	6.7	6.3	6.8	5.8	5.8	3.4	3.2
NEP U5	7.4	6.6	5.9	6.2	5.2	5.4	3.2	3.4
NFW U39	6.5	6.3	6.2	6.6	6.0	6.2	3.5	3.3
NOR U214	7.1	6.6	6.1	6.7	5.7	5.5	3.2	2.9
NST T67	7.0	6.5	6.1	6.5	5.4	5.4	3.5	3.1
NWP V86	7.2	5.7	6.2	6.4	5.5	5.4	3.2	3.1
QRF U27	6.7	6.3	5.6	6.1	5.0	5.4	3.1	2.9
VVX V536	7.2	6.6	6.0	6.7	5.6	5.9	3.2	3.2
Av	7.1	6.3	6.1	6.5	5.5	5.5	3.2	3.1

While the sire averages are small differences, these translate into larger effects when classing heifers for replacements. The range within some groups was large. More daughters from some sires would be culled from commercial and especially Seedstock herds based on structural differences. Some of these differences may be due to the dams of the heifers and this analysis has not been made. It was hoped that Breedplan analysis of structural traits would allow this more detailed information. That is yet to happen.

Table 39 Round 2 Steer Scores

Sire	Front Feet Claw Set	Rear Feet Claw Set	Front Feet Angle	Rear Feet Angle	Rear Leg Side View	Rear Leg Hind View	Fat Score	Capacity	Muscle Score
BBA W86	6.4	5.8	5.7	6.1	5.5	5.4	3.6	3.3	7.9
BGX W006	6.5	6.3	5.8	5.8	5.4	5.6	3.9	3.8	8.5
NBB V86	7.0	5.9	6.0	6.1	5.6	5.7	3.9	2.9	8.1
NDI V87	6.2	5.4	5.7	5.8	5.6	5.5	3.8	3.6	7.7
NED V189	6.8	5.8	5.2	5.8	5.1	5.1	3.8	3.8	8.5
NEP W7	6.0	5.6	5.4	6.0	5.4	5.4	4.0	3.4	7.6
NKE W03	6.6	5.8	5.9	6.1	5.6	5.7	3.8	3.3	8.6
NKL W19	6.5	5.6	5.4	5.6	4.8	5.8	3.5	3.2	7.4
NQM V9	6.6	5.9	5.6	5.8	5.2	5.0	3.8	3.5	7.9
NST V51	6.7	5.8	5.9	6.0	5.2	5.2	3.8	3.5	8.0
NWP W120	6.6	5.8	5.5	5.8	5.7	5.2	3.7	3.3	8.4
NXT U85	6.6	5.8	5.8	5.9	5.3	5.6	3.7	2.9	7.9
WKH W26	6.3	5.4	5.5	5.8	5.3	5.2	3.8	3.8	8.9
Average	6.5	5.8	5.6	5.9	5.4	5.4	3.8	3.4	8.1

Table 40 Round 2 Heifer Scores

Sire	Front Feet Claw Set	Rear Feet Claw Set	Front Feet Angle	Rear Feet Angle	Rear Leg Side View	Rear Leg Hind View	Fat Score	Capacity
BBA W86	7.2	6.8	6.2	7.3	5.3	5.8	3.3	2.9
BGX W006	7.1	6.8	6.1	6.9	5.1	5.8	3.2	3.1
NBB V86	7.3	7.2	6.4	7.2	5.4	5.6	3.1	2.6
NDI V87	6.8	6.6	5.6	7.0	5.6	6.0	3.0	3.2
NED V189	6.8	6.5	5.7	6.4	4.9	5.9	3.1	3.2
NEP W7	6.9	6.6	5.6	6.9	5.6	6.0	3.1	2.4
NKE W03	6.8	7.1	6.1	7.1	5.5	6.1	3.1	2.5
NKL W19	7.5	6.7	6.0	6.7	5.0	6.3	3.0	2.8
NQM V9	7.6	6.8	6.4	6.8	5.1	6.1	3.1	2.9
NST V51	7.1	6.7	5.8	7.1	5.6	5.8	3.1	3.0
NWP W120	6.6	6.5	6.0	6.6	5.4	5.7	3.0	2.8
NXT U85	7.1	6.9	6.4	6.9	5.1	5.8	3.1	2.8
WKH W26	6.6	6.6	5.8	6.5	5.4	5.8	3.1	3.4
Average	7.0	6.8	6.0	6.9	5.3	5.9	3.1	2.9

The second progeny group have been remarkably similar to the previous year's scores. Some of the sires have definitely better progeny average scores than others.

Table 41 Round 3 Steer Scores

Sire	Front Feet Claw Set	Rear Feet Claw Set	Front Feet Angle	Rear Feet Angle	Rear Leg Side View	Rear Leg Hind View	Fat Score	Capacity	Muscle Score
CWJW93	6.9	6.3	5.8	6.2	5.6	5.6	3.5	3.3	7.8
DGJW06	6.8	6.3	5.5	6.1	4.7	5.5	3.8	3.5	8.2
NBBX63	6.2	5.6	5.6	6.0	5.5	5.4	3.7	3.1	7.9
NGMW391	6.3	5.6	5.7	6.0	5.3	5.3	3.6	3.6	8.1
NHZV113	6.3	5.4	5.6	6.0	5.5	5.7	3.8	3.4	7.3
NWPX27	6.4	6.1	5.6	6.1	4.9	5.0	3.6	3.4	7.6
SEWX11	6.5	5.8	5.6	5.7	5.3	5.7	3.7	3.2	7.6
SEWX18	6.3	5.8	5.6	5.9	4.9	5.1	3.8	3.5	7.8
VLYV429	6.2	5.8	5.7	6.4	5.5	5.1	3.8	3.6	7.6
VLYW363	6.2	5.6	5.8	5.8	4.8	5.2	3.4	3.6	8.0
WJYX19	6.4	6.0	5.6	6.0	5.1	5.7	3.3	2.9	8.0
WMCV9	6.3	5.5	5.9	6.1	4.8	5.4	4.0	3.4	7.8
Average	6.4	5.8	5.7	6.0	5.1	5.4	3.7	3.4	7.8

Table 42 Round 3 Heifer Scores

Sire	Front Feet Claw Set	Rear Feet Claw Set	Front Feet Angle	Rear Feet Angle	Rear Leg Side View	Rear Leg Hind View	Fat Score	Capacity
CWJ W93	6.7	6.2	6.0	6.6	5.7	6.0	2.5	2.7
DGJ W06	6.5	6.1	5.8	6.8	5.6	6.0	2.5	2.9
NBB X63	6.4	5.9	6.0	6.6	5.6	6.1	2.7	2.5
NGM W391	6.3	6.1	5.5	6.6	5.6	6.2	2.4	2.6
NHZ V113	6.2	5.9	6.1	7.0	5.5	5.5	3.1	3.2
NWP X27	6.6	6.3	5.8	6.5	5.6	5.7	2.6	2.6
SEW X11	6.5	6.5	5.9	6.8	5.4	5.8	2.6	2.9
SEW X18	6.2	6.1	5.8	6.9	5.4	5.7	2.9	3.1
VLY V429	6.4	6.3	5.9	6.9	5.4	6.2	2.6	3.2
VLY W363	6.3	6.1	5.9	7.1	5.8	6.1	2.3	2.8
WJY X19	6.1	6.1	5.7	6.6	5.3	5.9	2.3	3.1
WMC V9	6.3	6.0	6.1	7.0	5.6	6.3	2.6	2.8
Average	6.4	6.1	5.9	6.8	5.5	6.0	2.6	2.9

Structural scores from the third round were slightly lower (closer to the ideal) than the previous year. This may have been a dry year effect. The heifers were definitely leaner.

No udder traits are reported because the number of dry females in each year meant that females per sire were less than useful for valid comparison.

Analysis of Progeny performance and Bull EBVs

The AEPT program provided was designed top run large groups of progeny in contemporary groups to generate high quality sire comparisons. Because of logistics involved in this process, the data recorded became extremely valuable as a means of testing how well the figures used to select bulls were reflected in the progeny. At the conclusion of the progeny test, the Animal Genetics and Breeding Unit (AGBU) based in Armidale were contracted to analyse how well the bull EBVs, at the time they were selected for the program, related to the performance of their progeny. In effect, the AEPT data became a testing ground for EBVs and for the Breedplan process.

So, did they work?
Three calf crops from 2002 to 2004, representing 38 test sires with 1034 progeny were used in the analysis. Data on progeny growth, including heifers on pasture and steers on pasture and during feedlot finishing, carcase results from live animal scans and steer slaughter was used in the analysis.

EBVs of bulls selected were low accuracy but typical of yearling to two year old bulls sold in the industry. Most bulls were from well recorded herds. In all sire groups, in all years, the EBVs did a good job of predicting how the progeny would perform for growth traits. For birth weight, 200 day weight, 400 day weight and for 600 day weight, the EBVs generally predicted how the progeny would perform.

Mid-parent EBVs were compared to the phenotypic measures of the progeny. The expected regression coefficient for a mid-parent EBV on the progeny phenotype is 1.0. All weight traits were close to expectation with coefficients of 1.14, 1.07, 1.20, and 1.17 for birth weight, 200 day weight, 400 day weight and 600 day weight respectively. These results indicated that we actually got more growth than what was expected.

With female fertility and maternal traits, numbers per sire over years did not allow sufficient analysis. Conception rate and calving ease data were recorded and contributed to sire EBVs but not enough data was recorded to allow analysis of sire starting EBVs against progeny performance.

Table 42 Average progeny performance differences when progeny of the 3 bulls with the highest EBVs are compared to 3 bulls with lowest EBVs – Birth Weight

	Round 1 Birth Wts	Round 2 Birth Wts	Round 3 Birth Wts
Av 3 high Bth Wt EBVs	5.8	6.5	6.3
Av 3 low Bth Wt EBVs	2.3	3.0	3.5
EBV difference	3.5	3.5	2.8
Expected progeny difference	1.75	1.75	1.4
Av high progeny birth wt	38.5	35.9	35.7
Av low progeny birth wt	37.0	34.7	34.9
Actual progeny difference	1.5	1.2	1.2

Table 43 Average progeny performance differences when progeny of the 3 bulls with the highest EBVs are compared to 3 bulls with lowest EBVs – 200 Day Wt

	Round 1 200 Day Wts	Round 2 200 Day Wts	Round 3 200 Day Wts
Av 3 high 200 D Wt EBVs	44	47.7	44
Av 3 low 200 D Wt EBVs	29.7	32.7	30.6
EBV difference	14.3	15	13.4
Expected progeny difference	7.2	7.5	6.7
Av high progeny 200 Day Wt	215.2	202.7	219
Av low progeny 200 Day Wt	208.2	206.5	214.6
Actual progeny difference	7	-4	4.4

Table 44 Average progeny performance differences when progeny of the 3 bulls with the highest EBVs are compared to 3 bulls with lowest EBVs – 400 Day Wt

	Round 1 400 Day Wts	Round 2 400 Day Wts	Round 3 400 Day Wts
Av 3 high 400 D Wt EBVs	80.3	81.7	80
Av 3 low 400 D Wt EBVs	59	63.3	54
EBV difference	21.3	18.4	26
Expected progeny difference	10.7	9.2	13
Av high progeny 400 Day Wt	430.6	353.8	336.2
Av low progeny 400 Day Wt	412.3	340.2	325.4
Actual progeny difference	18.3	13.6	10.7

Table 45 Average progeny performance differences when progeny of the 3 bulls with the highest EBVs are compared to 3 bulls with lowest EBVs – 600 Day Wt

	Round 1 600 Day Wts	Round 2 600 Day Wts	Round 3 600 Day Wts
Av 3 high 600 D Wt EBVs	99.7	100.7	102
Av 3 low 600 D Wt EBVs	73.7	79	76.7
EBV difference	26	20.7	25.3
Expected progeny difference	13	10.4	12.6
Av high progeny 600 Day Wt	635.3	559	434
Av low progeny 600 Day Wt	620	533	418.7
Actual progeny difference	15.3	26	15.3

Table 46 Average progeny performance differences when progeny of the 3 bulls with the highest EBVs are compared to 3 bulls with lowest EBVs – Carcase Wt

	Round 1 Carc Wts	Round 2 Carc Wts	Round 3 Carc Wts
Av 3 high Carc Wt EBVs	51	56.7	64.7
Av 3 low Carc Wt EBVs	34.7	39.3	44
EBV difference	16.3	17.4	20.7
Expected progeny difference	8.2	8.7	10.4
Av high progeny Carc Wt	402.7	352.3	258.4
Av low progeny Carc Wt	391.1	328.5	352.7
Actual progeny difference	11.6	23.8	5.7

Table 47 Average progeny performance differences when progeny of the 3 bulls with the highest EBVs are compared to 3 bulls with lowest EBVs – P8 fat

	Round 1 P8 Fat	Round 2 P8 Fat	Round 3 P8 Fat
Av 3 high P8 Fat EBVs	+1.0	+0.6	Data not
Av 3 low P8 Fat EBVs	-2.1	-2.0	available
EBV difference	3.1	2.6	
Expected progeny difference	1.6	1.3	
Av high progeny P8 Fat	19.2	18.2	
Av low progeny P8 Fat	16.8	16.9	
Actual progeny difference	2.4	1.3	

For carcase traits, correlations between EBVs and progeny performance were lower than for growth traits. Carcase weight, P8 fat and EMA EBVs again predicted progeny performance in all years and in all groups except for one year with EMA. IMF% EBVs were disappointing when compared to carcase results but were satisfactory compared to scan results. The lower correlations for carcase results may also be partly due to the low level of recording of carcase traits in the Trangie cow herd. Carcase EBVs were also influenced by the change in the way overseas sires are analysed, especially for IMF%. All sires used in the progeny test had starting EBVs derived from a system of analysis that has changed to improve the way overseas data is used. This complicates the analysis of the EBVs and progeny performance, particularly for IMF%.

A number of areas requiring more research were identified and recommendations for changes to the adjustment factors used for heavy carcasses were made.

It is recommended that the adjustment procedures to correct carcase data to 300 kg be reviewed by analysing the full carcase data set available for Angus. Changing the carcass adjustment factors also necessitates a review of all genetic parameters for carcass traits.

Did the EBVs change?

Every time new information on animals, their relatives and especially their progeny is submitted, Breedplan re-estimates the breeding values of those animals. Each time additional data is submitted for analysis, there is a chance that that data will cause the EBVs to change. This is a desirable situation. New information that changes the way an animal's genetics appear to be working should change the current understanding of that animal's breeding values. When additional or new information is analysed, the resulting EBVs may rise or fall.

Normally changes would be expected to occur within limits. The degree of possible change is described by accuracy figures published with each EBV. Confidence ranges (or standard error tables) are published widely for all breeds to explain how much change may be expected for animals of different accuracy and for different traits.

The bulls selected for the AEPT did have changes to the figures on which their selection was based. They performed in the range that would be expected from 38 bulls selected on what were effectively low accuracy EBVs (70% weight traits, 50% carcase traits). The most important thing is that the EBVs did do a good job of indicating how progeny performance would behave. Some EBVs went up. Some went down. Some stayed the same. Over the number of bulls included and the number of EBVs available on each bull, the amount of EBVs change was still low.

The level of change in EBVs is shown in Figure 2:

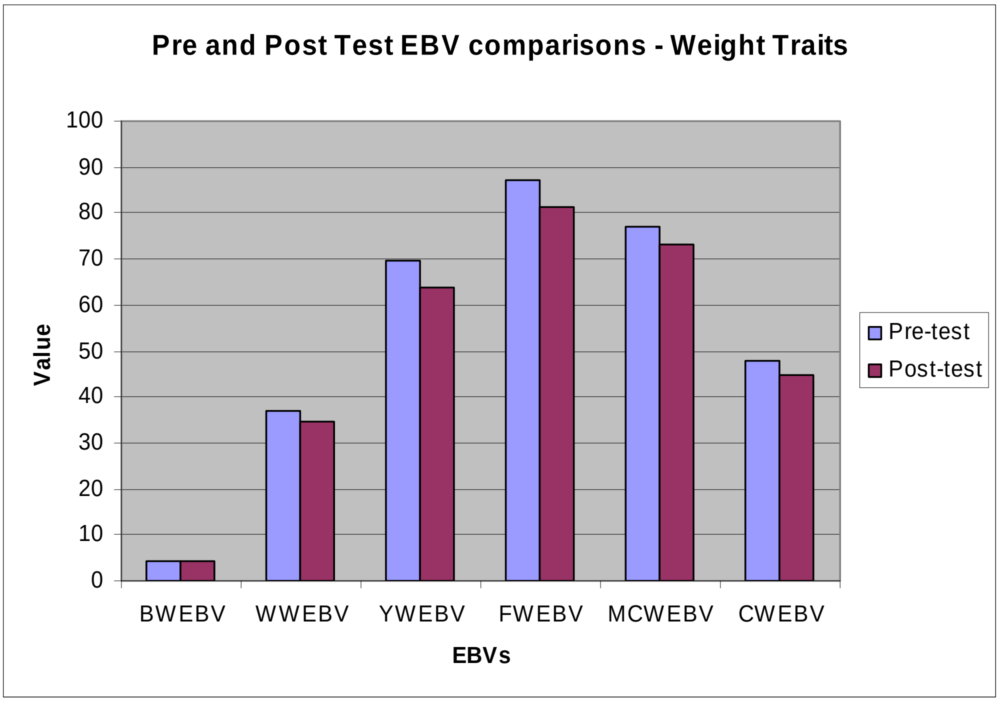

Figure 2 Pre and Post Test EBV comparison for weight traits

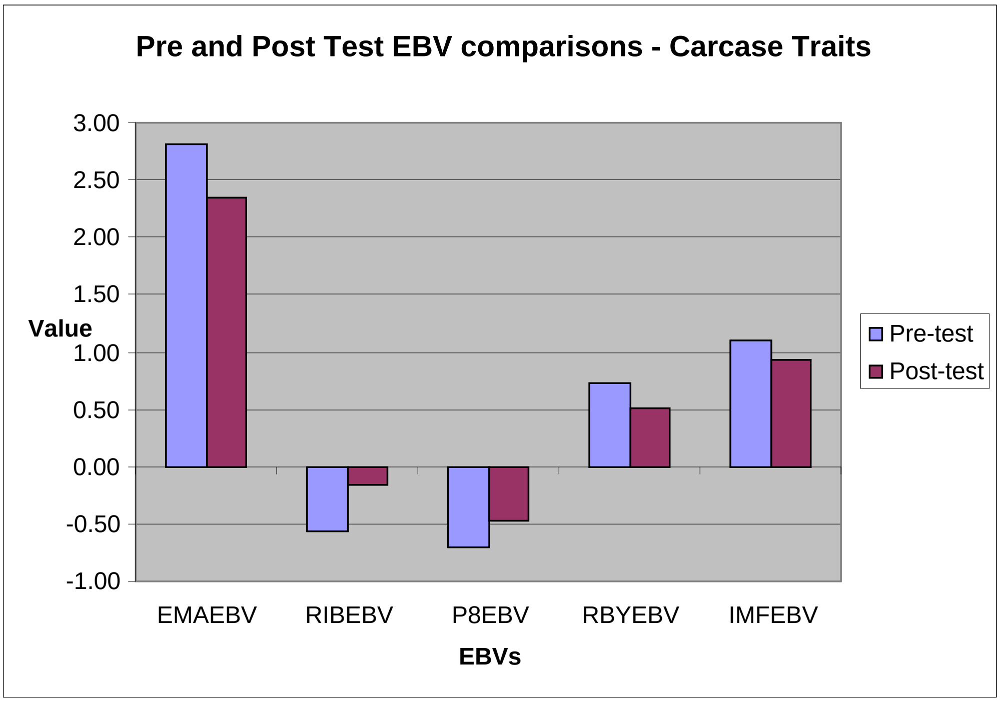

Figure 3 Pre and Post Test EBV comparison for carcase tratis

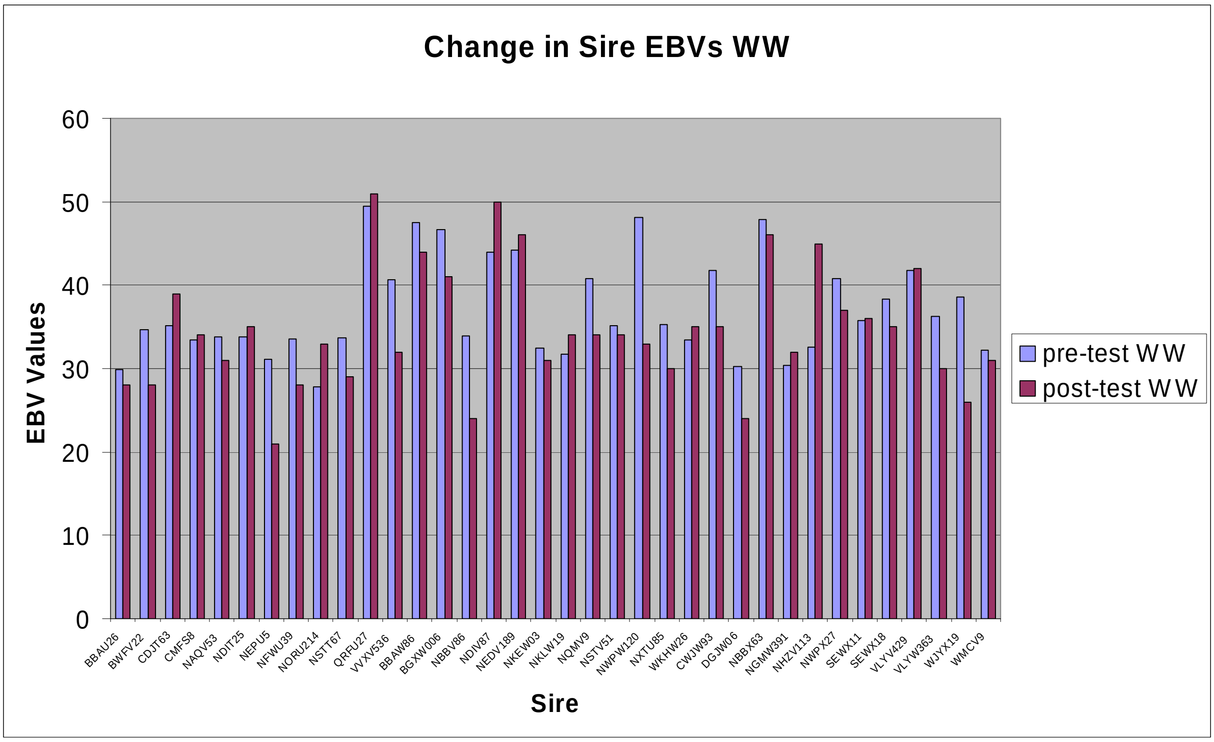

Figure 4 Change in Sire EBV for 200 Day Weight

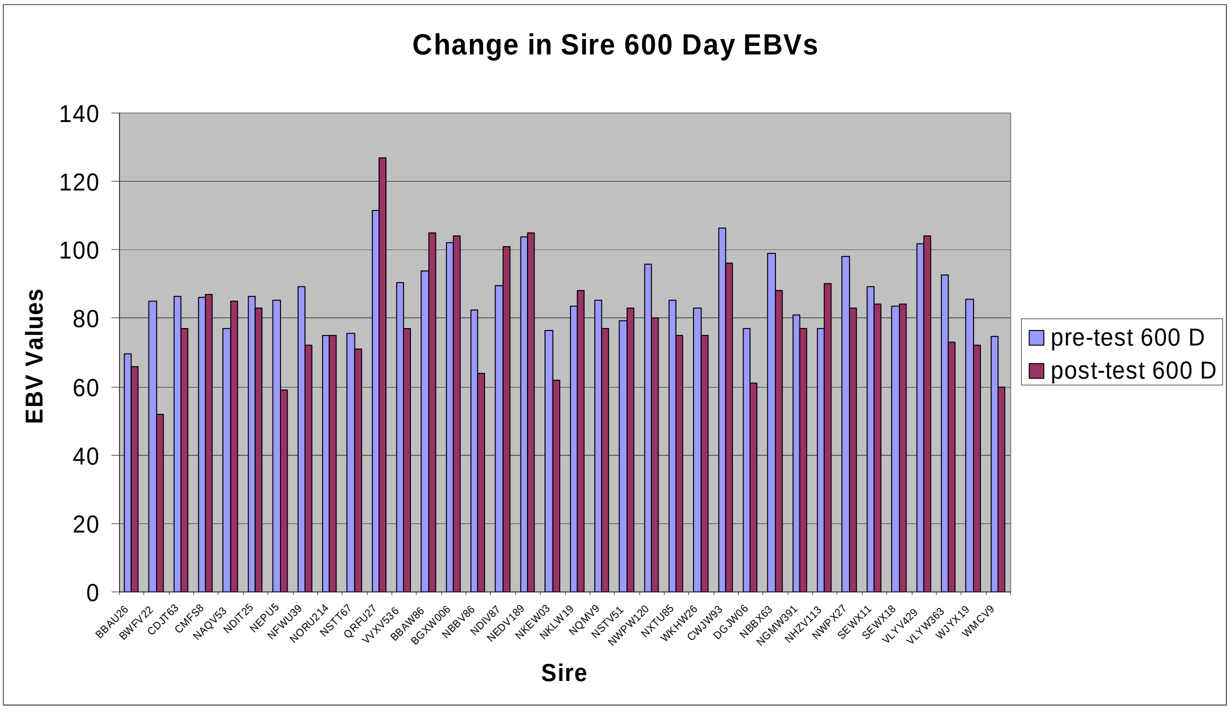

Figure 5 Change in sire 600 Day Wt EBVs

Decline in EBVs Over Time

Bulls used in the AEPT had 600 day weights and carcase data included in the June Group Breedplan analysis following the slaughter of their steer progeny. With the slaughter of steer progeny, no more direct weight information on progeny is submitted from the progeny test information. There is follow up information on the progeny of the retained daughters and their progeny. In addition, some of the Progeny Test Program bulls have been used in other herds and additional data has been analysed apart from the program data.

With these provisos, there has been a decline in the EBVs of test bulls over time. In some cases these changes to EBVs have occurred with little change to accuracies. Table 41 shows changes from June analysis following the recording of final weights. While not all bulls have declined and while the decline in 600 Day Weight shown is small, it is an issue that AGBU and ABRI are currently investigating.

Table 48 Change in 600 Day Weight EBVs and accuracies over time

Ident	Herds	Proj	EBV June 04	Accuracy June 04	EBV June 05	Accuracy June 05	EBV June 06	Accuracy June 06	EBV June 07	Accuracy June 07
BBAU26	7	62	72	88	66	88	66	89	63	89
NAQV53	1	35	87	87	85	87	85	87	84	88
NWPV86	2	53	91	89	90	90	85	90	86	91
NEPU5	2	61	64	90	62	91	59	91	58	91
VVXV536	4	63	97	89	86	91	77	93	79	95
BWFV22	2	56	58	90	55	90	52	90	51	91
CMFS8	10	100	86	91	87	91	87	92	85	92
NFWU39	2	53	75	90	74	91	72	93	70	93
NORU214	3	116	80	93	77	94	75	94	72	94
NDIT25	38	381	91	95	86	96	83	97	82	97
QRFU27	3	117	133	91	130	92	127	93	123	94
CDJT63	3	80	86	91	81	92	77	93	75	93
NSTT67	5	98	70	89	72	89	71	90	71	90
NWPW120	4	51			77	89	80	90	77	91
NXTU85	2	125			73	95	75	95	73	95
BGXW006	2	29			112	88	104	90	105	90
NEDV189	3	76			108	91	105	92	103	92
NKLW19	1	23			90	86	88	86	88	86
NQMV9	2	87			81	91	77	92	75	93
WKHW26	4	111			80	90	75	93	77	93
NDIV87	3	37			102	88	101	88	102	89
BBAW86	2	28			105	86	105	87	103	87
NSTV51	4	91			90	92	83	92	82	92
NBBV86	2	32			63	87	64	88	65	88
NKEW03	3	111			65	85	62	87	59	88

$Indexes

Bulls selected for the AEPT were selected on their CAAB $Index. This index weights those traits that influence profit from progeny in a system that breeds commercial steers from a self replacing herd where the steers are fed for a medium time (150 days) for a moderate marbled carcase. In this index, traits that receive strong weighting are calving ease, female fertility and growth. Carcase traits like marbling and receive moderate emphasis. Comparing starting $Indexes to current $Indexes is unfair. The $Indexes used when selecting bulls were based on EBVs calculated under a different system to that currently used.

$Indexes change as the underlying EBVs change. For the bulls selected in the AEPT, some $Indexes have gone up reflecting changes growth, birth weight, female conception and carcase figures. Others have gone down for the same reasons.

Table 49 Round 1 sires and CAAB $indexes

Sire	Starting CAAB $Index	Current CAAB $Index
Ardrossan New Design V053	$58	$55
Campbell Farms Emulation V536	$51	$47
Comfort Hill Stockman U26	$35	$45
Eastern Plains New Design U5	$61	$48
Edi Angus A Rito S8	$55	$66
Glenavon United U39	$60	$54
Kennys Creek Tonkin T25	$58	$46
Mitta Valley Titan T63	$58	$47
Moogenilla V22	$51	$28
Raff Ultimate U27	$55	$41
Rennylea U214	$63	$82
St Pauls Trav-Albert T67	$49	$49
Wattletop Vibe V86	$55	$52
Group Average	$54.5	$50.8

Table 50 Round 2 Sires and CAAB $Indexes

Sire	Starting CAAB $Index	Current CAAB $Index
Five Star Whiskey W6	$66	$64
Kansas Pied Piper W19	$59	$56
Comfort Hill Yellowstone W86	$50	$58
Eastern Plains Max W7	$51	$40
Koojan Hills Somethin Special W26	$53	$58
Rosevale V9	$58	$49
Kennys Creek Headliner V87	$53	$58
Twynam Uppercut U85	$67	$58
Wallaroy Vanguard 2000 V189	$63	$59
Alumy Creek KM Future Direction W03	$59	$56
Bald Blair New Design V86	$55	$52
St Pauls Vampire V51	$47	$38
Wattletop Wooly W120	$70	$60
Group Average	$64.0	$54.3

Table 51 Round 3 Sires and CAAB $Indexes

Sire	Starting CAAB $Index	Current CAAB $Index
Alloura Warrior W06	$59	$57
Booroomooka Westall W391	$67	$68
Brumar Vanquish V9	$33	$29
Hazeldean V113	$42	$51
Hidden Valley Existence X18	$69	$43
Hidden Valley Expectation X11	$62	$58
Lawsons GAR Precision W363	$69	$58
Strathtay Universe X19	$56	$45
Witherswood Waterloo W93	$71	$57
Ythanbrae New Design 036 V429	$84	$68

Bald Blair RockN D X63	$65	$57
Wattletop Future Direction X27	$59	$53
Group Average	$61.3	$53.7

Can we have any confidence in EBVs?

The AEPT program has given sufficient proof that EBVs work well for growth, some fertility and most carcase traits. They are not perfect and when buying bulls for a commercial herd, a number of the results of this project should be considered. These can be summarised in the following points:

1. Use the EBVs that are important to you to change the traits that you want to change. The bulls that have EBVs that indicate they will produce progeny with higher or lower performance for those traits will on average produce progeny with the differences desired.
2. When you buy young bulls, some of them will disappoint and some will perform above expectation. When you buy your bulls from a well recorded herd the performance of the progeny should, on average, be very simular to what the EBVs predicted.
3. Gambling on one animal based on EBVs and $Indexes is a risk. Paying substantially more for bulls with slightly higher EBVs or $Indexes is a risky process. Small differences in EBVs (eg 600 Day wt EBV of 80 vs 85 or B3$Index of +$90 vs +$83) are not significant when the EBVs may change over time.
4. If you buy a number of bulls each year or over time, the EBVs and $Indexes will select animals that will genetically move your herd in the direction you choose.
5. The Breedplan figures measure genetic differences that you would expect to see in an animal's progeny for the trait being reported. They will not tell if an animal is structurally sound, is of a maturity type that you seek or if you will find the animal visually acceptable for your own preferences. You still have to make those decisions visually.

Benefits from AGBU Analysis?

As a result of the AGBU analysis, a number of recommendations have been made for changes to Breedplan.

1. The analysis has shown that the way of correcting heavy carcase results back to the comparison standard of 300 kg needs revision. New correction factors have been derived and these should mean more accurate calculation of EBVs from heavy industry carcases for EMA, IMF% and carcase fat.
2. Correlations between IMF% EBVs and progeny MSA marble scores were not good. The relationship and the quality of IMF figures for bulls based on scans needs to be reviewed.
3. One of the areas shown in the progeny test results has been the slow decline in growth EBVs of the bulls over time. EBVs of quite a number of bulls, once their progeny growth data was included, continue to gradually decrease in successive Breedplan analyses. Similar reports from industry examples have been made. This decline in figures was investigated and changes to the analysis system to overcome this problem are planned for the June 2008 Angus Group Breedplan analysis.

GeneSTAR Markers for Marbling and Feed Efficiency

EBVs are one method of assessing genetic differences in breeding animals. Gene markers are another method of gauging differences in genetic value. A number of commercial gene marker tests are currently available for Australian cattle breeders. Genetic Solutions, now Catapult Genetics released a number of markers for different traits affecting cattle productivity. Early in the AEPT, genetic material of the progeny test cattle was submitted for testing using the GeneSTAR markers. The Trangie animals gave Catapult Genetics access to a large group of carefully recorded animals individually tested for feed efficiency, growth and carcase traits.

While the Trangie sample group is small and the range in phenotypic performance is more narrow than some other industry data sets, the large contemporary groups of parent verified animals give a chance to evaluate the usefulness of gene markers much as has been done with the sire EBVs.

When preliminary analysis of the relationship between GeneSTAR markers and steer performance was made, the following results were achieved:

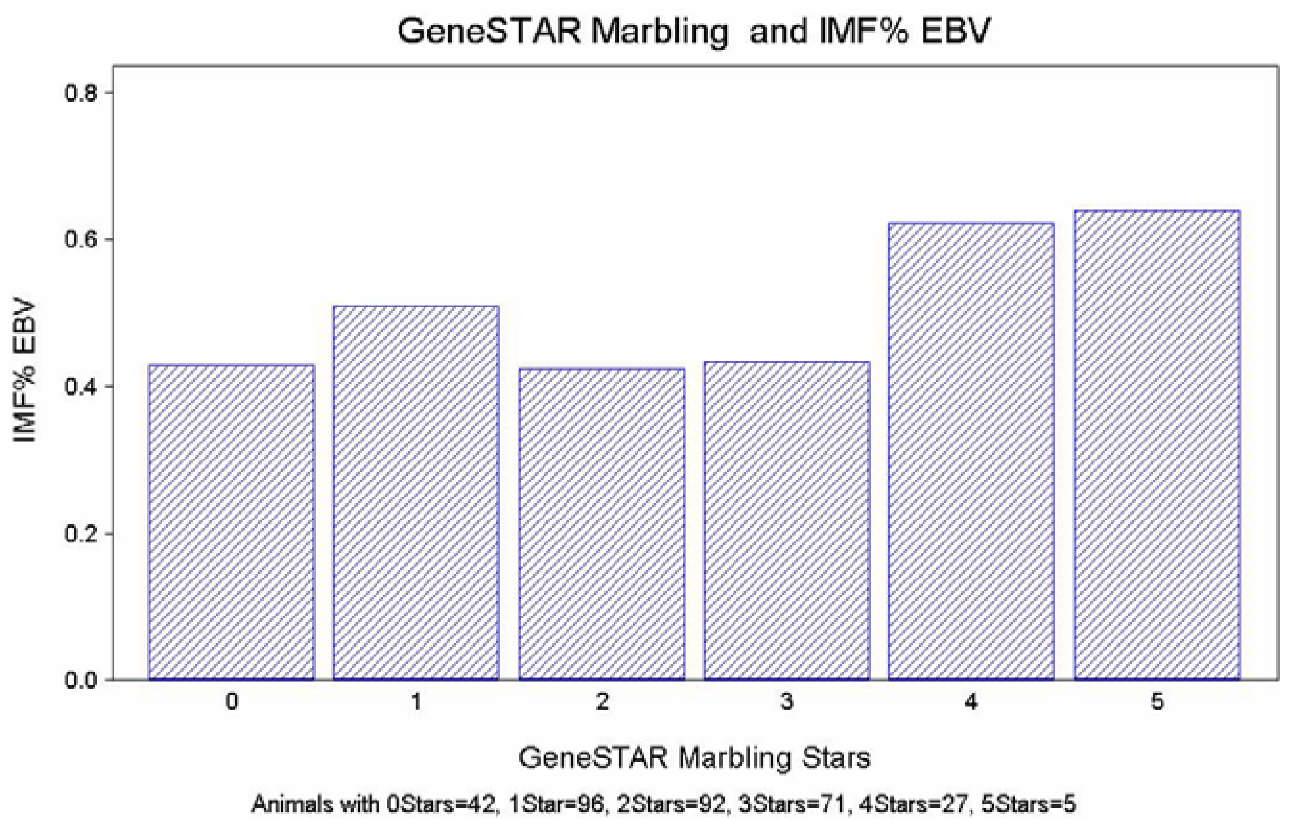

Figure 6

This graph shows little improvement between GeneSTAR marbling markers and EBVs for IMF% derived mainly from scan data. The greater number of marbling stars is not increasing the EBV for marbling.

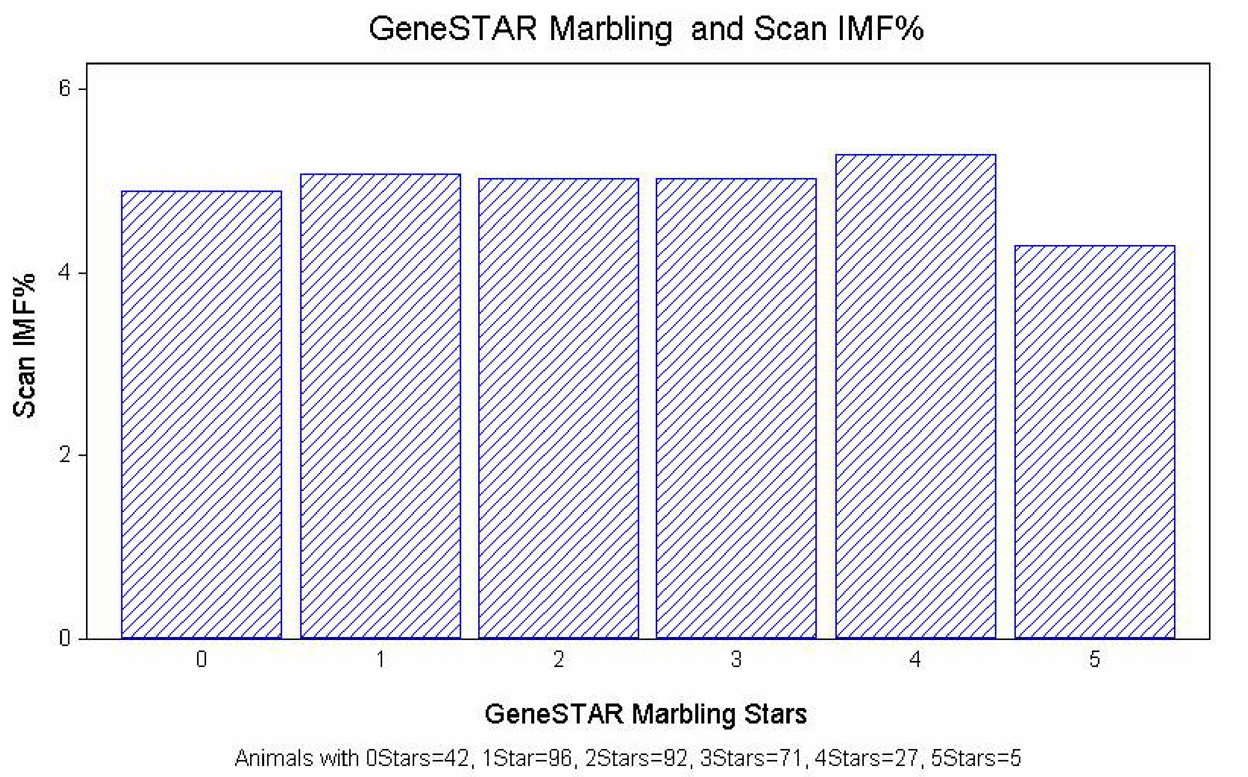

Figure 7

In the graph above, there is little difference between the number of marbling markers (stars) and the amount of marbling measured by live animal scans.

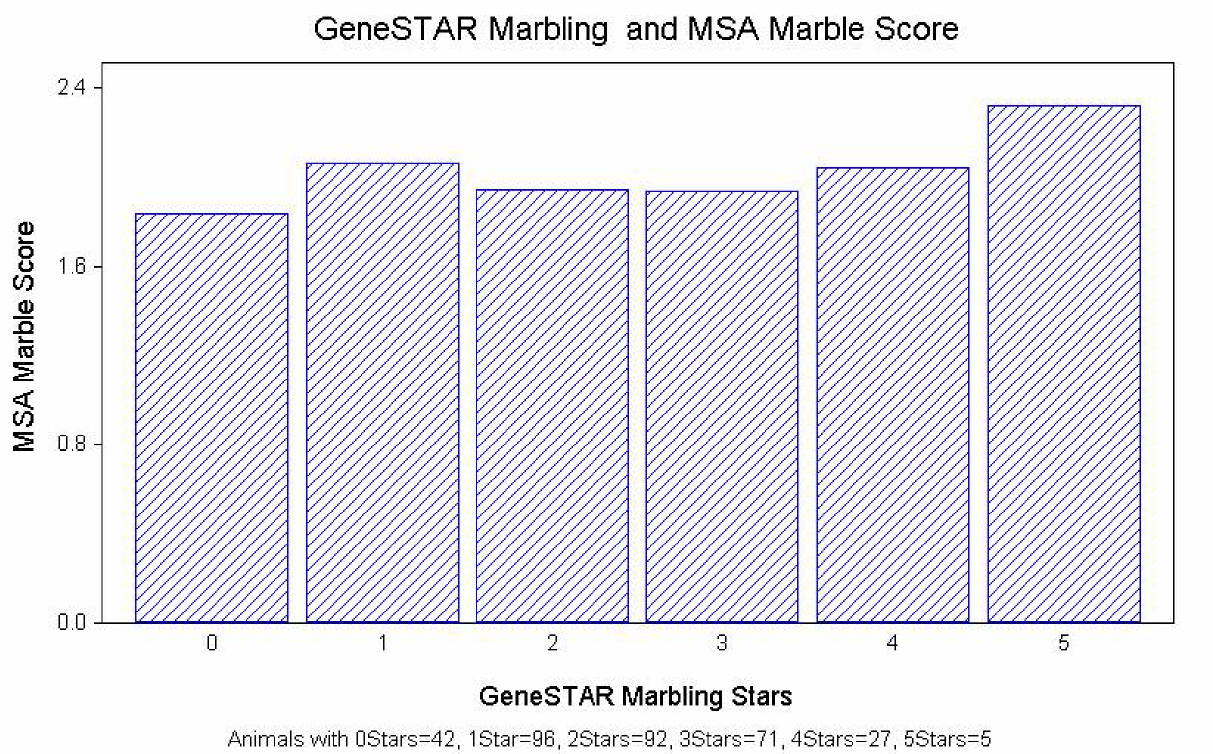

Figure 8

Again with the graph above, little improvement in MSA Marble Score was recorded as GeneSTAR marbling stars increased.

In the scatter plot below, carcase IMF% EBVs are related to GeneSTAR marbling markers. Each cross depicts one animal and relates Carcase IMF% (derived from MAS Marble Score) to the number of stars reported using GeneSTAR marbling markers. This indicates that little increase in carcase IMF% occurs as number of stars increase and that there is a great distribution of carcase IMF% within each star measurement.

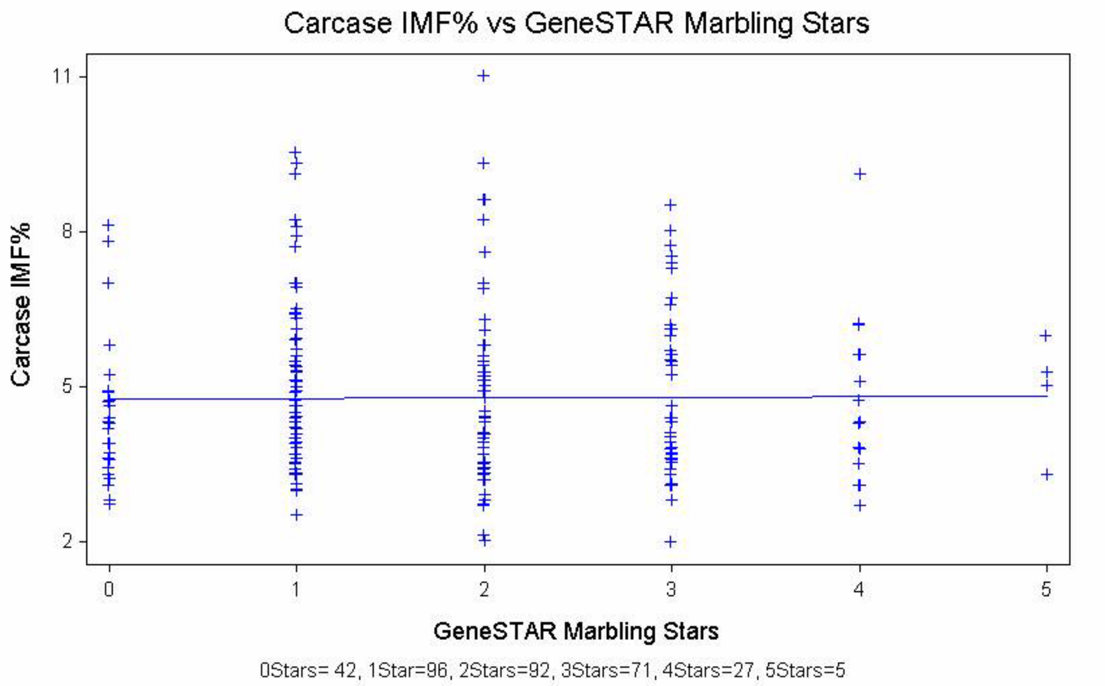

Figure 9

GeneSTAR Feed Efficiency and AEPT NFI results

The following graphs show results of Angus Australia analysis of feed efficiency measured in NFI tests with a large number of progeny over 3 years and 2 different locations when compared with the newly released GeneSTAR Feed Efficiency markers. The GeneSTAR feed efficiency markers report feedlot finishing efficiency as do the AEPT results.

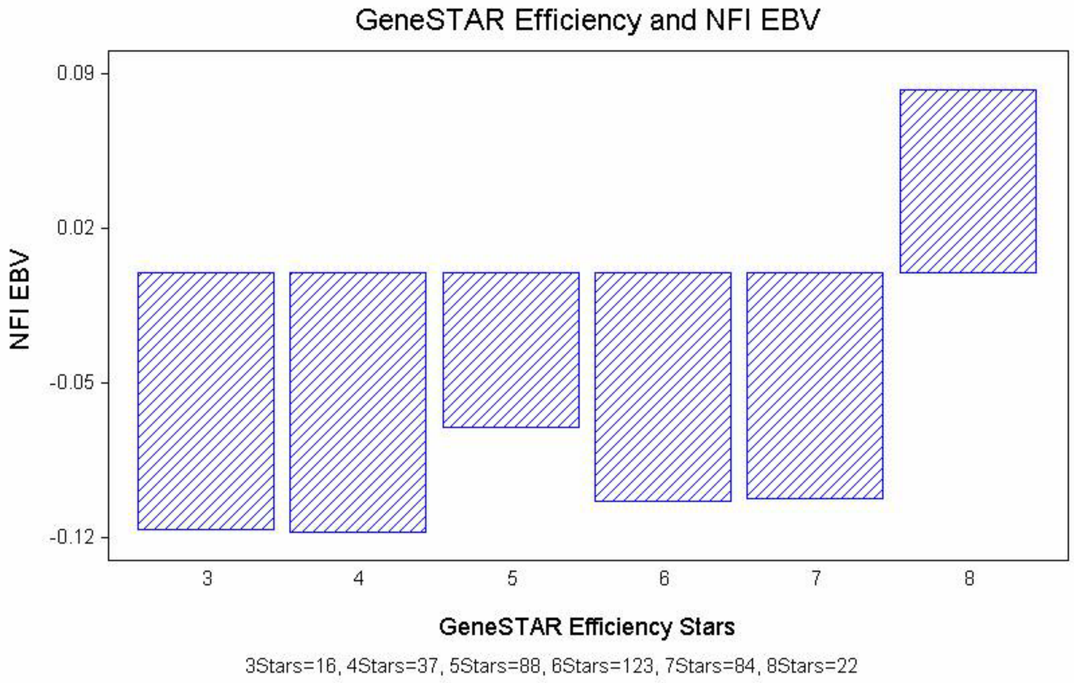

Figure 10

This figure shows feed efficiency measured using AA NFI EBVS compared to GeneSTAR Feed Efficiency stars. There is little difference in efficiency as the number of stars increase, in fact the highest star number is related to the worst (most positive) NFI.

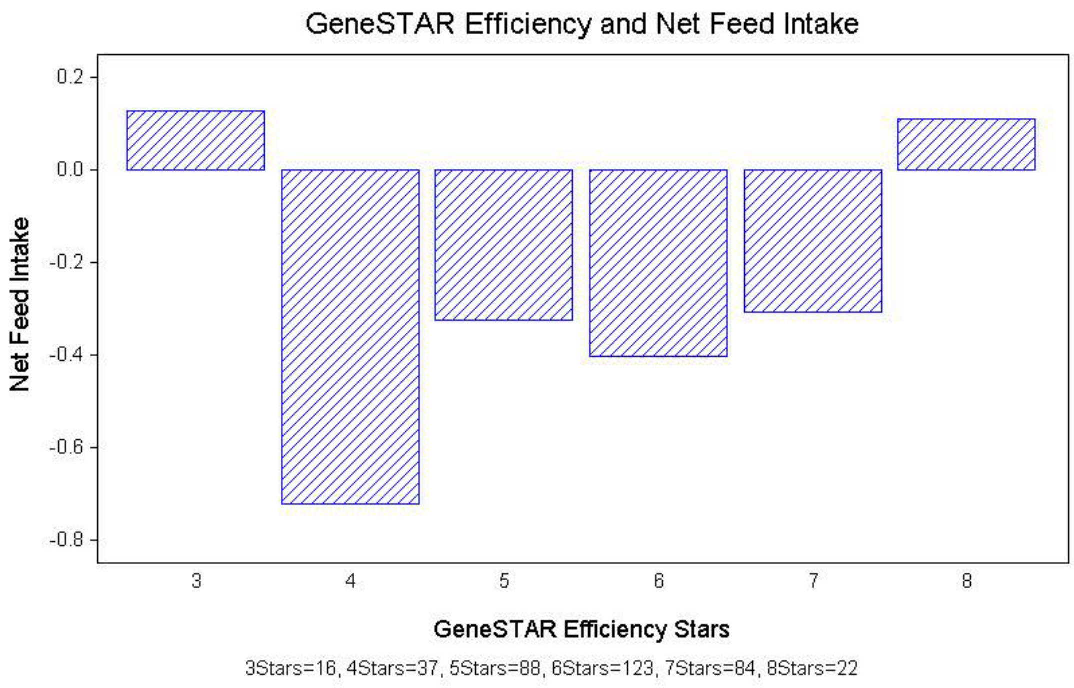

Figure 11

When compared to the actual AEPT NFI test results, again the above graph shows no improvement in NFI as stars increase.

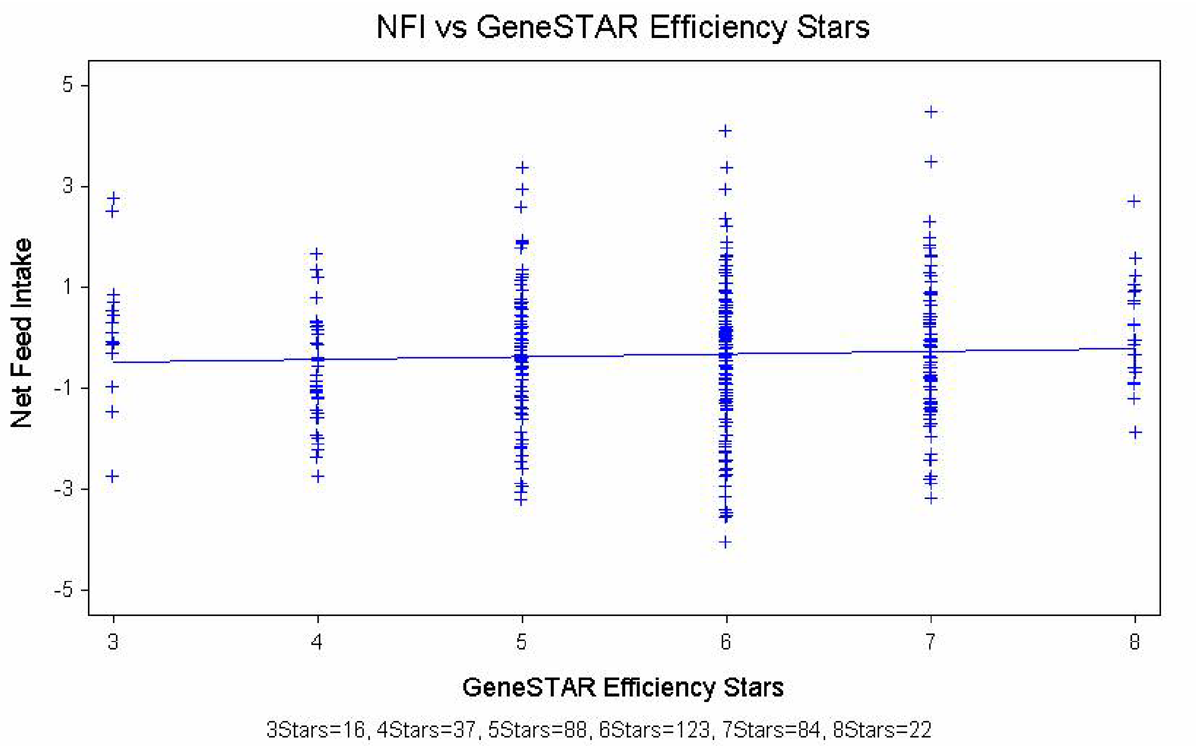

Figure 12

In the last scatter plot, the trend line for this trait is flat. It should be steeply sloped downward if the number of stars were an indication of decreased feed intake or more efficient animals. This is not the case. There is an equally wide distribution of feed intake at all stars. Therefore it can be assumed that in this sample the stars are not indicating differences in measured feed intake.

With all the problems of small sample size and limited range of gene expression, these are real results involving no small investment. If these results are duplicated elsewhere, these results would suggest little benefit in testing for GeneSTAR markers when the benefits of the tests do not seem to be reflected in the commercial performance of well recorded animals.

The industry is currently assessing the value of gene markers using results from the CRC animals and other research groups. The AEPT data will also be included in this evaluation. The research project is called the SmartGene project and this will give a more definitive assessment of the value of gene markers for marbling, tenderness and feed efficiency.

What Has the Progeny Test Achieved?

Progeny testing programs are very expensive to run. They are expensive in operating costs and are very expensive in time to manage and to collect and analyse data. Individual breeders involved in the AEPT invested heavily and few of them have received financial rewards for this investment. Angus Australia invested heavily in staff time and promotion.

The AEPT provided an environment to progeny test Australian bulls where any Angus breeder in the country could participate. It generated a large amount of information and provided a venue and a data base for research into a number of industry issues. From the AEPT, the following have been achieved:

1. Large scale DNA testing procedures and paternity testing were trialled and developed.
2. Bulls were progeny tested with female and steer data being utilised. This has been more than simple steer and carcase data.
3. Industry bulls were evaluated for NFI. This included the development of IGF-1 testing on a large scale.
4. Data from the AEPT was instrumental in proving new understanding of NFI for growth and for finishing. Ultimately this data helped prove that expected application of IGF-1 test results were not as useful as first thought. While this is disappointing, the relationship needed to be established.
5. The data from the AEPT has demonstrated that EBVs, while not perfect, do work.
6. AEPT data will contribute to improving correction factors for heavy carcases in Breedplan analysis.
7. Data from the AEPT have questioned the usefulness of GeneSTAR markers for marbling and for feed efficiency. The AEPT data will be utilised, along with other data, to determine how gene markers will be incorporated into Breedplan.
8. The AEPT led to developing the Angus Young Sire Program where young, low accuracy bulls are now tested in Seedstock herds.
9. Promotion of Australian Angus internationally has benefited by the fact that we were testing locally bred bulls under our environment, for our markets and using measures like feed efficiency that are not available in other countries.
10. A protocol for inclusion of abattoir carcase data is being developed to overcome problems like that experienced with the Round 3 data and other progeny test abattoir data.

Identification of Elite Bulls for Export?

When breeders nominated bulls for the AEPT, they were convinced that their bulls were “special” and hoped that their bulls would be proven to be worth of wider use. Progeny test programs in other industries show that the number of really elite bulls identified is low. The dairy industry tests large numbers of bulls from specially contracted matings each year hoping to find outstanding individual individuals. When they do find a bull of high promise, these bulls receive extensive use. In testing Australian Angus bulls, the hope was to identify bulls of outstanding merit.

Close examination of bulls selected in each of the three rounds shows that it is difficult to identify those bulls that walk on water and are recognised as excelling in all traits. The AEPT has tested 38 bulls. Some have definitely out performed others in terms of progeny performance. In each group there are bulls that have excelled in certain traits. Finding a world beater depends on your selection criteria. The bulls tested in the AEPT are different. Australian or overseas breeders seeking feed efficient sires will find in the AEPT bulls that are feed efficient and are high performers in most other areas of performance, growth, female performance and carcase.

In Round 1, EDI Angus A. Riot S8 is an ideal heifer bull that will bring calving ease, light birthweight, above average growth and excellent carcase along with high feed efficiency and acceptable structure. Campbell Farms Emulation is the highest feed efficiency bull in the test program but comes with adequate growth and carcase. Raff Ultimate has the highest growth and carcase weight with excellent structure. For non marbling markets where growth is the main requirement, Ultimate is the highest growth bull from all test years.

In Round 2, there are a number of high growth bulls with acceptable carcase performance. Wallaroy Vanguard, Kansas Pied Piper and Comfort Hill Yellowstone demonstrate these characters with different feed efficiency levels. Koojan Hills Somethin Special was a light birthweight, moderate performance bull with excellent progeny structure and good carcase.

Round 3 needs the inclusion of abattoir carcase data before final decisions can be made. Published EBVs will change with this data included. It is still too early to make this decision but Witherswood Waterloo and Hazeldean Perfect Storm look to hold promise as feed efficient bulls with well balanced performance.

Enhanced Genetic Tools for the Australian Beef Industry

The Angus Elite Progeny Test program has confirmed that the national Breedplan system has performed well for most traits that it reports. The program has given confidence that the industry EBVs do indicate how progeny will perform.

In the data collected, several recommendations are being made for refinements and improvements to the system. These changes, if implemented will improve the operation of Breedplan for heavy carcases.

The collection of large numbers of feedlot derived NFI records have provided data for changes to the analysis and reporting of NFI EBVs. This process also provided significant data for evaluating the value of IGF-1 tests. Unfortunately this data led to indicated lower correlations between IGF-1 and NFI feedlot test results. While a disappointment, this is an important outcome.

The data collected will provide a valuable resource for determining how gene markers can be incorporated into Breedplan EBVs. The NFI feed test data will be extremely informative in this process.

Recommendations

1. That Angus Australia publishes this report providing it to bull owners and all interested members.
2. That the carcase data for the third round of the progeny test be added to the data file for Angus Group Breedplan analyses in June 2008.
3. That AGBU revised adjustments for heavy carcases and revised carcase parameters be introduced in the June 2008 Angus Group Breedplan run.
4. That a new “solver” system to overcome EBV decline be introduced in the June 2008 run.
5. That the AEPT data be included in current SmartGene research to investigate the feasibility of incorporating gene markers into Breedplan.