

**BEEF CATTLE : THE MEASUREMENT, RECORDING COSTS
AND BENEFITS IN ESTIMATING BREEDING VALUES**

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SUMMARY

The direct costs associated with the measurement and recording of productive traits from which breeding value predictions can be calculated are between \$26 and \$35 respectively for retained heifers and bulls. (These figures will alter according to the percentage retained). If sire reference and BLUP programmes are included the costs rise to approximately \$106 per bull sold (dependent on the numbers of bulls to be sold). The vigorous marketing of breeding value figures can affect the financial returns from high performance bulls as well as increasing the returns from the progeny of such bulls for the bull buyer. Comprehensive calculations showed that the returns to such recording costs are sufficient to more than cover the costs.

INTRODUCTION

The paper discusses the direct costs associated with recording and measuring important productive traits in beef cattle in New Zealand. It reviews the costs of associated programmes designed to maximise the benefits of Breeding Values calculations.

Finally the paper examines current strategies in marketing breeding values and recommends improvements which will benefit the bull breeder and his bull buyer client.

MEASUREMENT AND RECORDING

In both New Zealand and Australia there still exists a great deal of tradition where selection of breeding cattle is based on subjective assessments and breed characteristics.

There are however many 'progressive' breeders who in their concern to put "dollars in the pockets" of their bull buying clients, have well defined breeding programmes built around productive traits.

These are the breeders who are putting in the effort at some financial cost to themselves to meet industry demands in today's hard economic

environment.

My objective is to determine what are these costs in taking these measurements. Dr T.H. Rudder, at a paper to this conference in 1979 outlined the requirements of a beef measurement system and listed the recommended traits. He also looked at some of the costs and indicated that each situation must be considered separately.

1. Fixed Costs

Objective measurement cannot be carried out without weighing scales, however these are used for management and selling decisions as well as for performance recording. Therefore the total annual cost of the scales should not be borne by recording. Other pieces of equipment such as a cattle crush, calculator, computer hardware are also essential to recording activities but like the scales are used for other purposes.

Table 1 Fixed costs per year

* Weighing scales

\$3,000 installed	- depreciation	\$135	
	- maintenance	\$60	
	- interest	\$264	
		—	\$459

* Crush

\$500 installed	- depreciation	\$22	
	- maintenance	\$10	
	- interest	\$44	
		—	\$76

* Calculator

\$50	- depreciation	\$10	
	- maintenance	\$5	
	- interest	\$8	
		—	\$23

Stationery \$20

Total \$578

(based on a life of 20 years salvage
value 10% of initial cost (IC)
maintenance of 2% IC, interest at 16% (NZ))

2. Variable Costs

Let us take an example based on a 100 breeding cow herd. This herd is breeding bulls for sale and retaining 80% of its heifers as replacements. The property has good facilities and experienced personnel. Wages have been set at \$60 per day.

What are some of the productive traits and the steps needed to measure these?

1. Animal identification - it is essential to develop a unique system of identification which generally starts with a new born calf being tagged. In a single sire mating programme the sire will be known and the final link is the establishing of cow-calf pairs.
2. Weaning Weights - generally between 4-7 months of age the calf is weaned. The calf is weighed and adjusted for environmental influences. All calves are ranked within the herd on their Breeding Value (weaning weight) figures. Each dam is credited with the calf it weans (mothering/milking ability) and all dams in the herd are ranked on their reproductive performance within age groups.
3. Yearling weights - all heifer and bull calves are generally run in separate mobs and are reweighed at approximately one year of age. They are ranked within the herd on their adjusted growth rates [Breeding Value (yearling weight)]. At the same time a sire summary is produced which evaluates all herd sires based on their progeny's performance (growth).
4. Later weights - all yearlings (heifers and bulls) can be weighed at rising 2 years of age when further within-herd rankings and sire summaries are produced.
5. Cow weights - it is now possible to record cow weights in Beefplan and with the weight of calf weaned, produce a measure of cow efficiency.
6. Bull fertility - breeders concerned with the improvement of the breeding soundness of their herd sires/sale bulls have tests conducted which include libido and measuring scrotal circumference.

Table 2 Variable costs

Cattle tags	100 @ 85c	\$85.00
Prepare record book/number tags	(1 man ½ day)	\$30.00
Identify calves/record day of birth	(4 observations @ 2 men for 1 day)	\$480.00
Cow - calf pairing/recording	(2 men for 1 day)	\$120.00
Weigh weaners	(2 men for ½ day)	\$60.00
Records (weaners)	(½ day)	\$15.00
Cull weaners	(2 men for ½ day)	\$30.00
Yearling weight	(2 men ½ day)	60.00
Records (yearlings)	(½ day)	\$15.00
Cull yearlings	(2 men for ½ day)	\$30.00
R 2YO Weight	(2 men ½ day)	\$60.00
Records (R 2YO)	(½ day)	\$15.00
Cull R 2YO	(2 men for ½ day)	\$30.00
		<u>\$1,030.00</u>

Recording : Processing (bureau)

100 cows @ \$3/head	<u>\$300.00</u>
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Software packages (pedigree/performance recording) are currently available to New Zealand beef breeders at a cost of \$1,450. In this example it would take 5 years of recording 100 cows at \$3/cow to cover the initial cost of the package. Once this initial cost had been met the variable costs would reduce to \$804 (\$22.33/heifer retained and \$29.7/bull retained).

Table 3 Summary of costs

	Heifers	Bulls	Total
Fixed Costs	289	289	578
Field recording	515	515	1,030
Record Processing	150	150	300
	<u>\$954</u>	<u>\$954</u>	<u>\$1,908</u>
* 90 calves produced			
retain 80% heifers (36)	\$26.50	-	-
retain 60% bulls (27)	-	\$35.30	-
COST TOTAL (63)	-	-	\$30.28

Economics

While the total recording and measuring costs involved with this herd have been a charge on the replacement rising 2 year old heifers and bulls retained for breeding or sale at rising 2 years of age, there are other benefits to the herd from the sire summaries/dam rankings which are produced for the \$3/cow recording charge. These have not been accounted for. Many of the field recording costs represent a cost whether the stud is performance recording or not

e.g. tags, identifying calves at birth, cow-calf pairings and culling.

In the example the cost of \$35.30 per rising 2 year old bull for measuring and recording traits represents the extra running costs of the recorded bull compared with an unrecorded steer of the same age.

THE COSTS OF ASSOCIATED PROGRAMMES DESIGNED TO MAXIMISE THE BENEFITS FROM BREEDING VALUE CALCULATIONS

In any performance recording of livestock the true value is gained in the exploitation of the superior animals identified in the within herd recording system.

What are some of these programmes and how much do they cost?

1. Sire Referencing (SR)

In New Zealand a sire referencing programme for Angus cattle has been in operation for 11 years during which time approximately 1100 sires have been evaluated.

The current cost per herd is \$250/annum.

In the example used earlier let us imagine that of the bulls retained for breeding, the stud breeder wishes to use two home-bred bulls in the stud. To evaluate them across the industry he introduces an AB sire as part of a SR programme.

2. Best Linear Unbiased Predictions (BLUP) Analysis

Programmes are in place at Ruakura Agricultural Centre in Hamilton, NZ which offer a full BLUP analysis to beef breeders recording in Beefplan. Several larger herds have already used this service.

In the example, the breeder has been recording for 10 years and decides to have a BLUP analysis. The current cost in New Zealand is \$500/herd for single or multi-trait evaluations.

Table 4 Summary : Overall Costs

	Heifers	Bulls	Total
Fixed Costs	289	289	578
Field recording	515	515	1,030
Record processing	150	150	300
SRS (\$250/herd)	125	125	250
BLUP (\$500/herd)	250	250	500
TOTAL	\$1,329	\$1,329	\$2,658

Cost per:

* 36 retained heifers	\$36.91	-	-
* 27 retained bulls	-	\$49.22	-
* 63 total	-	-	\$42.20

Because the 25 sale bulls (2 retained as herd sires) are the major revenue source for the breeder in any one year, the total cost (\$2,658) should be recouped from bull sales. The total cost per 25 sale bulls is \$106.30, in other words the breeder needs to increase the revenue from his sale team by \$106.30/head.

MARKETING STRATEGIES FOR BULLS

Traditionally there have been hundreds of bulls sold on each side of the Tasman where the criteria used to establish bull prices have been the stud name, how successful that studmaster has been in the show ring and/or how many high priced bulls he has sold/bought lately.

If stud breeders as earlier suggested are concerned about breeding bulls which put "dollars into the pockets" of their bull buying clients, then they should vigorously market their bulls according to their productive potential (breeding value).

Information collected by MAF Consultants in New Zealand suggests that there is a stronger correlation today than there was 10 years ago between performance information (as expressed in bull sale catalogues) and the sale price of a bull.

Figures were taken at bull sales in Hawkes Bay, South Auckland and Northland throughout the period 1977-86. The breeds of bulls were mainly Angus and Hereford and represented sales of bulls to commercial farmers. In 1986 from a catalogue of a large Simmental stud in Hawkes Bay a very strong correlation existed between performance and price (0.95).

Table 5 Correlations : Relative performance and sale price

Year	Correlation (Commercial bulls)	Breed	Correlation (Stud bulls)
1977	0.63	A & H	0.53
1979	0.80	A & H	0.77
1986	0.89	A & H	0.65
	0.95	Simm.	-

Corresponding values in 1977, 1979 and 1986 for correlations between relative performance and price at stud bull sales were lower than for the commercial bulls.

Compare now in Table 6 the relative returns from five rising 2 year old bulls (A, B, C, D, E) with differing BVs, assuming that each bull was mated to 40 cows each year for 4 years at 80% weaning (each bull leaving 128 calves).

In Table 6 the bull breeder has established the price of the bull (column ii) according to its genetic potential as expressed in the bull's BV(CW) (column i). At the end of the 4 years each bull is sold to the works (column iii), with the range of carcass weights increasing from 288 kg (181.5 c/kg) for bull A to 360 kg for bull E (195.5 c/kg). This provides a depreciation figure (column iv).

The cost per 20-month-old progeny sold (column v) is calculated by dividing the depreciation figure by the number of progeny sold, which is 96 (32 heifers retained in each case for breeding).

The expected average 20-month-old carcass weights (column vi) represent the expected genetic difference between the progeny of the five bulls. For example, bull B with a BV (CW) of 0.0 is average for the herd: the assumed average carcass weight for his 20 month old progeny is 240 kg.

Because bull C's BV(CW) is 12.0 kg the expected carcass weights of his progeny will be 6 kg (as the bull contributes half the genes to its progeny, the other half coming from the dam) heavier than the progeny of bull B.

The gross return per 20-month progeny (column vii) is calculated by taking the current scheduled value for each weight range 178.5 c/kg to 184.5 c/kg.

The net return per 20-month progeny (column viii) is calculated by subtracting the cost per animal (column v) from the gross return figure (column vii).

The lifetime increment per bull (column ix) takes the price increment between bull A and the other four bulls (based on the net return per 20 month old progeny) which is multiplied by the number of progeny

sold (96) per bull. No account is taken of the additional value from the superior breeding value of the heifers retained in the herd.

Table 6 Comparative value of bulls differing in BV for carcase weight

(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	
Bull	BV (CW)	Purchase price	Sale price	Depreciation	Cost per 20 month progeny	Expected average 20 month old CW	Return per 20 month old progeny	Net return per 20 month old progeny	Lifetime Increment per bull
	(kg)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
A	-12.0	600	522	78	0.8	234	418	417	-
B	0.0	800	576	224	2.3	240	428	426	864
C	+12.0	1200	618	582	6.0	246	454	448	2876
D	+24.0	1600	665	935	9.7	252	465	455	3648
E	+36.0	2000	704	1296	13.5	258	476	463	4416

Bulls D and E, the highest two on performance, showed increments of \$3,648 (\$912/year) and \$4,416 (\$1,102/year) over the 4 years.

A bull breeder who has spent time and effort recording the performances of his animals should adjust the price of his bulls according to the BV or BI figures produced by Beefplan (as per the example).

He can realistically price his top performance bulls higher than in Table 6 in the knowledge that his client will benefit financially from the more productive progeny from such bulls.

In the example the response is a "sire effect" only. Had the better bulls been mates to superior performing dams the improvement and financial return would be expected to be greater. Also, no account was made of the superior breeding value of the 32 heifers sired by bulls C, D, and E, who were retained in the herd.

REFERENCES

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