Australian M112 TRIAL

The international competitive nature of the food industry, in which beef is just one of many food products competing for the consumers dollar, is driving today's beef exporters away from commodity trading toward providing more specialised, quality assured product(s) that can be brand identified and promoted. The catalyst for change has principally been increased access to key export markets in Japan.

At the exporter level, considerable investment has gone into upgrading plants to improve throughput, achieve higher product quality standards and produce brand name product lines that meet guaranteed minimum standards defined by the Ausmeat product description language. Whilst no one would argue against the logic of this sharpened market focus, so often promoted, actually being able to purchase and process cattle that perform

predictably to the required market specifications remains a major obstacle, Results from the Meat Research Corporation s M112 project conducted with the commercial feedlot industrv has highlighted the need for industry to improve feeder steer predictability with regard to growth, yield and product quality traits if they are to maximise export opportunities in these expanding but tightly specified markets.

With the co-operative support of 9 commercial feedlots throughout eastern Australia the M112 project has selectively purchased and will on completion have evaluated the performance of over 4000 steers representing around 250 beef sires from southern Australian beef herds. The performance of a further 6340 northern Australian bred steers has also been evaluated. The northern Australian steers were not from known sires but represented 185 vendors and a range of breeds and crosses.

KEY FINDINGS

Some of the key findings from the M112 project include:

(a) Important breed differences do exist in growth, yield and marbling traits which producers can utilise in their breeding programs to more successfully achieve end-user specifications. However. the study also highlighted that breed alone was no guarantee of performance. Considerable differences also exist between sires within a breed in these traits.

(b) There is considerable scope to improve the performance and predictability of feeder steers being grainfed for the Japanese market. As a consequence, considerable lost opportunity to "value add" is being incurred by industry which no sector can afford to forgo. It is estimated that some vendors' steers have outperformed others by up to $150 per head. Sire line studies indicate that a substantial part of this is attributable to use of superior sires.

(c) Sires that performed well in this study had steers that all performed consistently above breed average rather than just having a few exceptional steers.

(d) Furthermore for that sire to be commercially superior his steers had to be above breed average in all traits important to that market segment and not just exceptional for one trait. Only about 5% of the sires evaluated in this project approached this criteria for either the marbled or non marbled segments of the market.

(e) Feedlotters are quickly learning that their client's breeding program is a critical factor which impacts on their operational efficiency. There are substantial commercial benefits to be gained by encouraging their clients to more closely align their "on farm" breeding program to specific markets. This will occur most rapidly if greater financial incentive or -cheque book language" is introduced. Other industries confronted with the same problem have opted for performance based marketing as the vehicle to acce [erate this process. Without such incentives, there will still be too many producers breeding '19th century- cattle for '20th century" markets.

SOUTHERN AUSTRALIAN SIRE TRIALS

The results were extremely encouraging for both feedlotters and producers targeting this market. They clearly demonstrate that Japanese end-user specifications for grain fed beef can more precisely and cost efficiently be produced utilising both breed differences and

genetically superior sires within a breed. Commercially important breed differences did exist in all traits measured except fat and meat colour, Table 1 details the breeds and sires evaluated so far in the project.

TABLE 1 SUMMARY OF BREED AND SIRE COMPOSITION OF THE MI12 TRIAL STEERS (EVALUATED TO OCTOBER 1994)

BREED	No. Of SIRE LINES	TOTAL No. OF STEERS
Angus	124	1825
Hereford	35	426
Polled Hereford	16	197
Murray Grey	28	444
Shorthorn	15	154
European/British*	19	204
TOTAL	237	3250

*includes Charolais/Angus, Limousin/Angus, Charolais/Shorthorn, Limousin/Shorthorn, Simmental/Hereford, Simmental/Angus, Simmental/,Murray Grey, Maine-Anjoue Shorthorn, Saler/Angus.

BREED EFFECTS

European/British cross steers achieved the highest 200 day liveweight gain (242kg) and Murray Grey steers the lowest (210kg). European/British cross steers also outperformed the other breeds with regard to the carcass yield traits. The steers had a larger eye muscle area (87 cm) and reduced carcass subcutaneous fat levels (22mm).

Breed differences also existed in marbling level with Shorthorn, Angus and Murray Grey steers outperforming Hereford, Poll Hereford, European/British cross and Hereford steers in this trait by at least 0.6 of a marble score. Furthermore intra-muscular marbling level appears to be unrelated to any of the other traits measured including P8 fat depth. Figure 1 summarises the breed and sire differences measured.

SIRE EFFECTS

Breed alone, was no guarantee of performance. Considerable differences also existed between sires within a breed for all traits except fat and meat colour, both of which appear to be more influenced by management including nutrition. Figure 2 illustrates the differences between sires for marbling whose steer progeny were lotfed for 200 days. Clearly, the current industry practice of relying on breed alone to achieve a moderate and consistent level of marbling will not succeed because of the variation which exists between sires in this moderately heritable trait.

A summary of all sires evaluated so far in the trial is provided in Tables 6, 7, 8, 9, & 10. The genetic performance of each sire is estimated for feedlot growth, carcass yield and marbling traits standardised to a 200 day feeding program. They are expressed in estimated breeding value (EBV) format from the breed average. THE EBVs ARE NOT BREEDPLAN EBVs. Sire trait leaders (top 5% based on their 112 EBVs) are provided for breeds with 100 or more sires represented.

In this study the actual measured commercial differences between sire progeny groups of steers of the same breed were up to $100 per steer (figure 3).

When this difference was corrected for non genetic effects EBV estimates indicate that a substantial part of this advantage was due to the sires superior genetics.

Table 2 provides an indication of the commercial returns potentially obtainable through selection of superior sires based on EBVs for traits important to commercial feedlot performance.

TABLE 2 SUMMARY OF THE ESTIMATED COMMERCIAL DIFFERENCES BETWEEN THE HIGHEST AND LOWEST RANKING ANGUS SIRES FOR GROWTH AND

CARCASS TRAITS

TRAIT	GENETIC (SIRE) EBV RANGE	STEER PROGENY ADVANTAGE	PRODUCTION GAIN (KG)	PRODUCT VALUE $/KG	$/HD ADVANTAGE (GROSS)
LIVEWEIGHT GAIN*	82 kg	+41 kg	41 LWT	1.60	66
DRESSING PERCENTAGE	3.8%	+1.9%	13.5 CWT	2.80	38
CARCASS WEIGHT*	57 kg	+28.5 kg	28.5 CWT	2.80	80
P8 FAT DEPTH	8 mm	-4 mm	3 kg SMY	4.20	13
EYE MUSCLE AREA	14 cm^2	+7 cm^2	3 kg SMY	4.20	13
MARBLING LEVEL	1.4 marble score	0 7	-	25¢ kg cwt/ marble score	65

* 200 DAYS ON FEED

RELATIONSHIP BETWEEN REEDPLAN EBVs AND THE MI12 EBVs

Some of the bulls evaluated in the M112 project also have Group Breedplan EBVs. For instance, there are 150 sires with an M112 EBV for carcass weight and a BREEDPLAN EBV for 400 (and 600 day) weight. The correlation between these 2 EBVs is 0.24. This means the 150 sires are not ranked in the same order by the M112 and Breedplan EBVs. There are 2 reasons for this:

1. Neither EBV is 100% accurate. The Breedplan EBV is based largely on measurements on the bull himself plus pedigree information. The M112 EBVs are based on an average of 10 steer offspring per bull and limited pedigree information when available. Both sets of EBVs are correlated with the "true" breeding values of the bulls but the correlation between the EBVs is reduced by the lack of perfect accuracy in them both. If both EBVs have an accuracy of 60%. i.e. 0.6, the correlation between them is expected to be 0.36 (i.e. 0.6 times 0.6).

2. The EBVs are for different traits. For instance, the M112 EBV is for carcass weight in 2 year old steers while the BREEDPLAN EBV is for liveweight in 400 day (and projected 600 day) bulls.

This would furthur reduce the expected correlation between the M112 EBV and BREEDPLAN EBV below 0.36 towards the observed correlation of 0.24 found in the M112 study. The Co-operative Research Centre (C.R.C.) project will investigate this question in more detail. If the reason(s) for the difference can be found, the accuracy of the M112 and BREEDPLAN EBVs will increase. The breeding industry can then target the Japanese grainfed market more precisely.

In the interim, cattle breeders selecting bulls should consider both sets of EBVs. Selection on BREEDPLAN 400 or 600 day EBVs will lead to offspring that grow to a given slaughter weight faster on either pasture based systems for all markets or grain finishing systems to local trade specifications.

A positive, but less precise trend should also occur for steers being grain finished to Japanese market specifications. The M112 EBV's are the only ones currently available for dressing percentage and marbling and they have the advantage of being based on commercial feedlot steers. However, they are available on a limited number of bulls and the design of the progeny test could be improved (e.g. by better genetic links between herds).

More progeny tests of sires for feedlot performance and carcass traits would clearly be of value to the industry but only, if they are well designed and managed. It is also desirable that the results from such tests contribute to the one set of EBV's to avoid confusion within the industry.

NORTHERN AUSTRALIAN TRIALS

The capabilities of 6340 northern Australian bred steers for the Japanese market were assessed in a trial undertaken with two Queensland commercial feedlots. The steers were purchased direct from Queensland and northern New South Wales beef breeding herds and grain finished for around 150 days. Table 3 summarises the number of steers evaluated in the trial according to their breed groupings and number of vendors participating.

The results showed that there was considerable variation between steers in commercial performance with regard to feedlot growth and carcass traits affecting estimated saleable meat yield and product quality. Breed, vendor (or property of origin) and age at entry all had important commercial influences on performance.

The average daily liveweight gain achieved over the 150 days feeding program was 1.55 kg/day. Breed group differences in feedlot growth performance did occur with European/British cross steers achieving the highest growth performance (1.64 kg/day) and high grade Brahman steers the lowest (1.42 kg/day).

Table 4 shows that many of the steers failed to make the preferred yield and product quality market specifications they were fed for. Using an industry derived yield equation, it was estimated only 45% of the steers achieved a boning room meat yield of 65% or higher (Grade A). The combined traits of carcass weight, P8 fat depth and eye muscle area were used in this equation. The use of European bulls on either British or Bos indicus cows increased both carcass weight and muscling but reduced carcass subcutaneous fat levels. As a consequence 68% and 62% of European/Brahman and European/British cross steers were estimated to achieve the higher yield grade as compared to 15% of Hereford steers. Other breed groups were intermediate.

With regard to product quality grading 58% of the steers attained an Ausmeat marbling score of 2 or higher necessary to meet the Japanese B2 market specification. Meat and fat colour levels attained by all breed groups after 150 days on grain were all highly acceptable, Average marbling levels attained were all at the lower end of the Ausmeat chiller assessment score range of 1 to 12. The proportion of steers which reached an Ausmeat marbling score of 2 or higher (needed for Japanese B2 market specification) varied from 84% for Shorthorn steers to 44% for Droughtmaster steers with other breed groups intermediate.

The performance of all breed groups are summarised in Figure 4. When interpreting the breed group differences found in this study, the large variation between vendors within a breed must be considered. Consequently, the performance of individual breed groups is not estimated precisely.

As with the southern trials, breed alone was no guarantee of performance. Considerable variation in performance existed between vendors both across and within breeds. For example feedlot growth performance varied by up to 44% between vendors.

Table 5 summarises the range in feedlot growth performance between high and low ranking vendors across all breeds for each trait after correcting for feedlot and pen effects. Also provided, is an estimate of the commercial value for this range in performance.

It was not possible to determine the repeatability of these vendor differences in subsequent steers purchased from the same vendors. If a vendors steers performance is highly repeatable feedlots can benefit substantially by buying from vendors whose steers performed well in the past. Southern feedlot based sire line trials have shown to hasten progress it is necessary to identify the bulls, cows and breed composites that are genetically superior in the commercially important and heritable traits dictating performance.

Figure 5 illustrates the range in commercial performance estimated to exist within a breed for vendors of Santa Gertrudis steers. Assuming the same feed intake levels, some Santa Gertrudis vendor's steers have outperformed others by up to $150 per head within the same breed.

Results from sire line trials suggest that a substantial part of this advantage is due to superior genetics. Clearly there is tremendous lost opportunity to "value add" occurring within the industry with regard to the Japanese grain fed beef market.

Age at entry also influenced feedlot growth performance with milk teeth steers outperforming 4 teeth steers by 0.10 kg/ day or 6.5%. Age at entry had no measurable effect on meat colour. It did have a small effect on both fat colour and marbling level attained.

Four teeth steers achieved a 0.14 higher marbling score than milk teeth steers but had slightly yellower (0.07 score) fat colour. Two teeth steers were intermediate.