MURRAY GREY Technical

October 2002

INFORMATION FOR MURRAY GREY SOCIETY MEMBERS

# CRC Research - Matching genetics to market requirements

By Wayne Upton,
ANIMAL GENETICS & BREEDING UNIT (AGBU)

In the last issue of Grey Country, CRC results were presented for Murray Grey steers and heifers in the beef CRC. This article will explore further the relationship between the genetic performance and the range in actual (phenotypic) results. To begin lets take another look at the tabulated results shown last time. Table 1 shows the carcase EBVs for Murray Grey sires used in the Beef CRC compared to breed average for 2000 drop calves and table 2 shows the average performance of Murray Grey steers for the different markets and finishing systems of the CRC.

Table 1: Carcase EBVs for sires used in CRC compared to breed average for 2000 drop calves.

| EBV | MA | RIB | RUMP | RBY% | IMF% |
|---|---|---|---|---|---|
| Av CRC Sires | 0.6 | 0.4 | 0.6 | 0.0 | 0.3 |
| Breed Av 2000 drop | 0.7 | 0.0 | 0.0 | 0.3 | 0.0 |

Table 2: P8 Fat Depth and IMF% at different market end points and for different finishing systems

| | P8 Fat Depth (mm) | | | | IMF (%) | | | |
|---|---|---|---|---|---|---|---|---|
| | Market | | | Average All Markets | Market | | | Average All Markets |
| Finish system | Domestic | Korean | Japanese | | Domestic | Korean | Japanese | |
| Feedlot | 9.3 | 11.5 | 12.6 | 11.1 | 4.9 | 6.2 | 8.2 | 6.4 |
| Pasture | 8.2 | 10.6 | 9.6 | 9.6 | 4.1 | 5.1 | 5.2 | 4.8 |
| Average both Finish Systems | 8.7 | 11.1 | 11.3 | 10.4 | 4.5 | 5.7 | 6.7 | 5.6 |

From these results it was suggested that an EBV value of 0.6 for rump fat roughly equates to 8.2 mm of fat on domestic weight carcases finished on pasture under the CRC production system. The last phrase is probably the most critical and carcase weights are tabulated in table 3 to help breeders identify with the production systems of the CRC. Breeders wanting to estimate the actual performance of certain genetics must first define their own production system especially in terms of the age and weight at slaughter.

Table 3; Carcase weights for Murray Grey steers under the different market endpoints and different finishing systems

| | Market | | |
|---|---|---|---|
| Finish system | Domestic | Korean | Japanese |
| Feedlot | 243 | 273 | 296 |
| Pasture | 215 | 227 | 243 |

By design the domestic weights were lighter than the Korean or Japanese export weights. The Japanese and Korean cattle were also older than the Domestic cattle. Feedlot finished cattle were younger than the pasture finished cattle.

The other important result discussed in the last issue was that the ranking of bulls remained fairly constant for domestic and export weights, meaning that the sire producing the fattest domestic calves also produced the fattest export calves. In effect this meant that there was only one P8 fat EBV needed. However it doesn't mean that the same sire is appropriate for all production systems.

Comparing feedlot finished cattle for the Japanese market with the pasture finished counterparts we find that the range of fat depths was a little different. Feedlot finished cattle ranged from 6 to 26 mm while pasture finished cattle ranged from 5 to 18 mm. Over-fatness will be more of a problem in feedlot finished cattle than with their grass finished counterparts.

The story for the domestic finished animals is similar with a range in fat depths from 1 to 12 and 2 to 12 for pasture finished and feedlot finished respectively. Again the average for the Murray Grey steer is ideal for most domestic price grids but the extremes, especially the low end might cause problems with finishing at the lighter weights.

The big difference in fattening was between the Japanese market weight and the domestic weight. These results show that the same genetics (remember all the sires lines were split across the different market segments) will have different levels of compliance depending on the market endpoint. Steers that are suitable for the Japanese market feedlot finished production system are likely to be too lean for a domestic weight pasture finished system. Selection of sires based on genetic potential for fattening (EBVs for P8 or rib fat) will be important once the market and production system have been selected. The answer to the question, can one sire excel in all finish market regimes, must be no.

CRC data was also used to demonstrate the effectiveness of EBVs. EBVs that were calculated prior to the submission of the carcase data (EBVs based mainly on scan data) were compared to the actual carcase data and the relationship was as expected. Sires with higher EBVs for marbling or fat produced carcases that had higher IMF values or were fatter. The relationship was not perfect; if it was there would be no need to go to the trouble of collecting carcase data. But the relationship was sufficient to promote confidence in the EBVs as a selection tool.

The average CRC sire was slightly above breed average for fat (see table 1) but were close enough to be reasonably representative of the current breed. The range in P8 fat EBVs, of sires used, was -2.0 to +2.5. The range of EBVs within the breed is from -3.5 to +6.2. Extrapolating the CRC results would suggest that extremely lean bulls in the breed are probably going to be hard to fatten on pasture at domestic weights and that the extreme fat bulls will cause over-fatness problems in the feedlot.

For commercial Murray Grey breeders these results should help determine what fat EBV will be suitable for the market being supplied, especially if that market is similar to a CRC case. However it is strongly recommended that if possible feedback is analysed from slaughter animals and matched to the EBVs of sires used to further benchmark the genetics with the phenotypic output.

The paragraphs above concentrate on P8 fat as it is a major determinant of carcase compliance. When more than one trait is considered, the message becomes even more complicated. Marbling or intra muscular fat (IMF) is quite positively related to P8 fat (genetic correlation >0.5) which means that if you select lean animals you are probably going to select animals with lower marbling also. Marbling and IMF are very highly related at the genetic level and can be considered the same for use in selection.

Murray Grey steers on average, had adequate amounts of marbling for most market categories as shown in table 2. Currently only the Japanese market, feedlot finished combination will value marbling. The 8.5% IMF should roughly equate to greater than 80% of carcases having a marble score 3 or better. Once again the trend in the IMF values is predictable; heavier feedlot finished animals have higher IMF values than lighter pasture finished cattle.

The range of IMF values for feedlot finished Japanese market weight cattle was 4 to 16 which

would approximate a range in marble score from 1 to 9. These results should please Murray Grey breeders as if you review the trial design, you will note that the time on feed of 180 days is considerably shorter than the time on feed to which most longfed animals are now subjected. One would expect the marbling levels to be higher with longer feeding.

The antagonism between marbling and subcutaneous fat is a challenge for cattle breeders especially those supplying the Japanese market with feedlot finished cattle. But the correlation is not absolute (ie the genetic correlation is not 1) so if you have information about both traits you can make selections to have leaner cattle with more marbling. The important consideration is that you have accurate information about the genetic merit of the animals to be selected. EBVs are the best genetic information to use.

**Take Home Messages**

· CRC sires are representative of current Murray Grey sires - EBV averages and ranges are similar

· The production environment of CRC is well described and can be related to commercial production systems

· Matching the genetics to the actual performance within the home production system will help to refine selection decisions

o Breeders should be aware of the requirements of the market being supplied and the capability of the production system to grow and fatten before selecting their sires

· The average and the range of fat and marbling will vary with the finishing system and the carcase weight

· Sires producing the fatter or high marbling progeny will do so under pasture or feedlot fattening and at different carcase weights

· Different sires will be needed depending on the carcase specifications; eg. a sire who produces progeny with ideal fat cover for a heavy carcase weight is likely to produce progeny that are too lean at lighter carcase weights

· Subcutaneous and IMF fattening are related but using EBVs the antagonism can be managed; eg. there are sires that are positive for IMF but negative for subcutaneous fat

· CRC sires on average were fatter than the 1999 average Murray Grey but with a range of EBVs; implications are that:

o sires with extremely low P8 EBVs may not be suitable for the pasture finished light carcase weights as they may be too lean

o sires with higher P8 EBVs may cause problems under production systems that induce rapid fattening eg. feedlotting

· While the average IMF values were quite suitable the range in IMF values suggests that high IMF EBVs will be more suitable for the longfed production system supplying a market that values marbling

· CRC research has demonstrated that fat and marbling are under genetic control (heritable) and that there is a range within the Murray Grey breed from which to make genetic selections this will facilitate genetic improvement.

For further information contact Bryan Johnston at the Murray Grey Beef Cattle Society, Elm Avenue, ARMIDALE NSW 2350. Phone: (02) 6771 5151 Fax: (02) 6771 5144 Email: bjohnston@murray-grey.com.au