

A Summary of Key CRC Genetics Findings and their Applications

Brian Sundstrom

Straightbreeding Program

From 1993 -2000, seven breeds were involved in a major 'progeny test'. This provided some 8,000 head for the genetics studies described below and also much of the CRC Meat Science and Nutrition work. All breeds were offered participation, but had to be in BREEDPLAN and able to provide large lines of commercial purebred steers. Known sires of these breeds were mated in Seedstock and Commercial herds. Steer progeny were finished at Domestic, Korean and Japanese market weights, 50% on grain and 50% on grass. Key findings were:

- BREEDPLAN EBVs of sires predicted steer progeny performance with very acceptable accuracy.
- Data collected allowed introduction of IMF% EBVs to BREEDPLAN and significant improvements in the way all the carcass EBVs are computed - in particular: by expressing them for the first time at a

weight endpoint (300kg DW steer); allowing abattoir/scanning and imported EPD information to be used; improving the Yield% EBV.

- With the new EBVs available, all these breeds have since made good to very good genetic gains in their carcass trends (refer Figure 1). This is quickly flowing to the commercial industry due to the high rate of BREEDPLAN use in these breeds.
- No significant re-ranking of sires for the carcass traits across Markets; Grain V Grass; or Nth V Sth environments.
- Benchmarking guidelines have been made available for these breeds ie: The specs of steers which will be produced under various market/production systems by sires of known EBVs.

Multibreed EBVs

Data from the CRC has been combined with the MLA Southern Multibreed experiment to provide Australia's first Multibreed EBV adjustment table. This is

initially for Poll Hereford; Angus; Simmental and Limousin and covers birth wt, growth and carcass weight. Other breeds and traits will be added progressively to this table, but the long term aim is joint analyses.

Genomics

- The CRC has a large and continuing molecular genetics program.
- CRC researchers have been closely involved in finding and/or assisting to quantify the affects of, the first genes for commercial traits, such as marbling and tenderness. These have since been commercialised , by Genetic Solutions Pty Ltd, as GeneSTAR® Marbling and Tenderness.
- Current work includes searching for other genes controlling marbling, tenderness, other meat quality traits, feed efficiency and tick resistance.

Feed Efficiency Research

- Genetic variation exists and the trait Net Feed Intake(NFI) was chosen to express this, being independent of weight and gain (detail page 59).
- NFI heritability is quite high and there appears to be no genetic antagonisms of major concern. One to watch however is that more efficient cattle are on average a little leaner and lower in IMF%. This genetic correlation is lower than birth to final weight for example and hence improvements in both can be selected for.
- Testing protocols have been developed and documented in a manual. Sufficient tests were done to allow the first BREEDPLAN across herd EBVs to be published in 2001

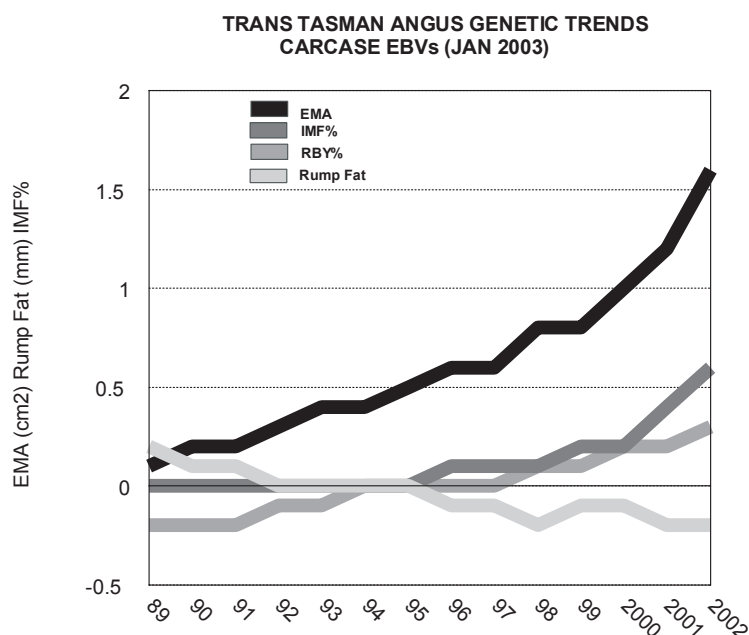


Figure 1

for Angus and Hereford. These are now in the main BREEDPLAN system and available on websites etc.

- Physically testing for feed intake (70 days) is expensive and widespread industry uptake is a big challenge. Current research is therefore seeking indirect measures of NFI. Gene markers are being pursued, but the most promising short term development is the IGF 1 (insulin growth factor) blood test.
- IGF 1 is known to be genetically correlated to feed efficiency in pigs and early CRC work suggests this also applies in cattle. The IGF test is not expected to fully replace feed intake measuring. It has the potential however to allow better selection of bulls to test and to significantly add accuracy to EBVs at a young age. IGF 1 is also genetically correlated to some fatness traits.

Northern Crossbreeding Work

From 1993 to 2000, the CRC had a major experiment in central Qld. Brahman cows were joined to Angus, Brahman, Belmont Red, Charolais, Charbray, Hereford, Limousin, Santa Gertrudis and Shorthorn. Progeny were grown out and finished in Northern and Southern locations. These cattle contributed to the Nth V Sth and Multibreed outcomes discussed above and growth path and transport/stress findings discussed in other papers in these notes. Further detail on this work can be obtained from the researcher in charge - Dr Heather Burrow.

