New Zealand fertility work

Pregnancy rate in beef cattle has a low heritability and hence is difficult to improve by selection within purebreds. It is however of such economic importance, that most serious breeding programs try to put some pressure on the trait. In BREEDPLAN this is done by using a combination of the scrotal size and ‘days to calving’ EBVs. Days to Calving is the ‘female fertility’ EBV calculated from mating and calving records and male relatives’ scrotal readings.

It is now well accepted that female traits such as age at puberty and subsequent pregnancy rate, are genetically correlated to the scrotal measurements of male relatives. Much of this knowledge was developed in the 1980s and ‘90s and one of the groundbreaking experiments in this area has been overseen by Dr Chris Morris and colleagues of Ruakura Research Station in New Zealand. They set up an Angus selection line experiment in 1984/85. This has a ‘HIGH’ line selected on early puberty of heifers (age at first behavioural oestrus) and male scrotal records. There is a ‘LOW’ line, selected for late first oestrus and a CONTROL line in the middle.

After nearly 20 years, the HIGH and LOW lines now differ by 69 days (18%) in age at puberty in heifers, 11% in scrotal circumference and over 5% in cow pregnancy rate; the HIGH line has the earlier puberty, larger scrotal circumference and higher pregnancy rate. This physically confirms that female fertility has a genetic component and progress can be made by selecting on a combination of male and female traits. It also shows the magnitude of change when heavy (sole in this case) selection pressure is put on these traits in a breed which is well regarded for its fertility.

As mentioned above, the herds were selected only on fertility. This has, however, led to a small (4%) increase in Yearling weight for the HIGH line and also slightly lower mature cow weight.

I was pleased to hear recently that these NZ fertility lines are moving into a new and important phase. Now that they have diverged sufficiently, they are assisting a search for the genes explaining the reproductive differences. The research group is currently in the fourth and final year of a project to breed 400 head which are crosses from the lines. DNA markers are being recorded and any associated with reproductive differences will be studied more closely.

Brian Sundstrom

While you are thinking of fertility matters: You may be interested to hear that BREEDPLAN will introduce in 2004, the use of AI data in the calculation of female fertility EBVs (Days to Calving). Currently only natural mating is used. As with all fertility recording, it will be important for studs to carefully note like treated AI groups and to record females culled infertile etc. The capturing of first calf heifer fertility data is particularly important. This is unfortunately missed by many breeders at present.

NZ Simmental and Charolais move to NZPBB

The NZ Charolais Society, based in Christchurch, made a decision some time ago to use Colorado State University (CSU) for its genetic evaluation services. Many of the leading Charolais breeders in New Zealand considered the EBVs from CSU to be inferior to those from BREEDPLAN and voted with their feet. They have now established Charolais Breeders New Zealand Inc. (CBNZI) and based their administration at NZ Performance Beef Breeders in Feilding in order to use BREEDPLAN services. The data from CBNZI is combined with that of the Charolais Society of Australia in an Australasian GROUP BREEDPLAN. Two runs are expected in 2004.

Christchurch has been the administrative home of Simmental NZ for almost 40 years. However, the Simmental NZ office is moving to NZ Performance Beef Breeders. This landmark decision will add considerable strength to the NZPBB operation. It also means that Simmental NZ will have access to a diverse and skilled administrative resource at NZPBB to help take the breed to new heights in the NZ market. It is estimated that 95% of the beef pedigree and performance recording in New Zealand is now being undertaken out of the offices of NZPBB. This move is consistent with worldwide trends for breed societies to rationalise the use of resources to remain competitive. In fact, NZPBB has been so successful it is setting an example to the rest of the world. This is a great credit to the diplomacy and skill of NZPBB Manager, Murray Meads.
Overseas developments - New Zealand focus

Breedplan News  -  Issue 14, January 2004

Beef breeding herds in NZ are under increasing pressure from other land-based enterprises - forestry, sheep, beef finishing and dairying, to name a few. Breeding cows are seen to have lower returns. While there is agreement that cows help maintain pasture quality and reduce parasitic loading by acting as mower, baler, hayshed and self-feeding device, there is no hard data to financially evaluate these 'hidden benefits'. Breeding enterprises are therefore disadvantaged in gross margin analyses, and continued effort is needed to improve their efficiency.

In beef production systems, researchers estimate 65% - 85% of the total feed is consumed by breeding cows and half of this is for maintenance. The farmer receives no return on this very significant maintenance feed cost. It is a fixed cost. Therefore reducing this overhead will have significant impact on profitability. More efficient conversion of feed to product is an issue for calf producers and finishers. Finishing animals out of parents selected for feed efficiency would generate greater profit per tonne of dry matter consumed.

There are a number of ways of expressing and measuring feed efficiency in beef cattle. Recent Australian, USA and UK research has concentrated on Net Feed Intake (NFI) as an efficiency measure. (Australian BREEDPLAN has taken this through to having NFI EBVs). NFI is the amount of feed an animal eats, above or below that expected for its weight and growth rate. For a given liveweight gain, some animals will eat more than expected and some less - these latter ones are more efficient in terms of NFI. With NFI, more efficient cattle can be selected within any weight range.

Associate Professor Steve Morris at Massey University is currently conducting a Meat NZ funded trial, investigating NFI under pastoral conditions. There are several objectives:

- To evaluate Australian sires with known NFI EBVs, to see if their EBVs are valid under NZ pastoral conditions.
- To devise systems of testing for NFI, if these EBVs are proven to be valid.
- In tandem with the NFI trial, to validate 600-Day Wt and Milk EBVs. By running the trial on four properties, the final objective will also be able to include an estimate of the relative impact on slaughter weight of Sire EBV and pre-weaning environments.

The project is generating calves from Angus cows using six lines of Angus bulls (four bulls per line). These lines are:

- High and low 600-Day Weight EBVs.
- High and low Milk EBVs.
- High and low NFI EBVs.

Because of delays in importing semen to having NFI sires, calves generated from these bulls arrived at Massey a year later than calves from the growth and maternal lines.

Preliminary results from year one born calves (growth and maternal lines only) to date show:

- There is little difference between the growth and milk lines with regard to the onset of puberty.
- Raw data indicates that there is a 24kg difference between the high and low EBV growth lines for the fast growing group and a 12kg difference between the high and the low growth lines. Most of this difference was there at weaning.
- The high and low milk lines were similar for growth but were behind both the high and the low growth lines.
- There was a 25kg precalving difference in weight between the high and low growth heifer lines, no difference in weight between the high and the low milk heifer lines, which were in turn lighter than both the high and low growth heifers.

Russell Priest

Figure 1 - Target liveweight profiles

http://breedplan.une.edu.au
Fine tuning cattle to the environment

The environment at Rockybank is considered to be suitable only for breeding, with a stocking rate of 1 cow to 45 acres in phosphorous deficient country. In this environment it is a challenge to get females to calve at 2 years of age and every subsequent year thereafter.

These hardships have led to some interesting discoveries by analysing the BREEDPLAN figures of the successful cattle.

In such an environment, females with high EBVs for 400-day growth (the period of joining) have trouble conceiving because they have not satisfied their requirement for growth from the nutrition available. These animals will use all their energy to grow and not have the energy to conceive. This problem is compounded if these heifers also have low fat cover EBVs.

The growth and fat factors of these heifers will override any effect of high EBVs for Scrotal Size their sire may have. That is to say that it does not matter how strong and well developed the reproductive tract of the heifers is, if the growth rate and fat are not matched to the environment then fertility problems will surface. The good news is that due to the high heritability of these traits (400-day growth and fat EBVs) the problem can be rectified quickly once the problem is recognised.

Having moderate 400-day growth and higher fat EBVs also gives your herd a window to finish for the local trade. The volume of fat is also important in the Bumper breeding herd. Late in the dry season, cows (and 1st calf heifers) must live on their fat reserves and often calve at this time. Cows that do not have adequate fat reserves will not go in calf the next year. The use of Rump, Rib, and IMF fat EBVs can maximise the volume of fat a female can carry without compromising (in some cases enhancing) market specifications. Evenness of fat cover is also very important to maximise the volume of fat a female can carry.

BREEDPLAN EBVs can be a very useful tool to streamline your genetics to your environment. A combination of EBVs can be a better guide to fertility and hence profitability. It is hoped this article may save some cattle breeders from going up a dry gully, and demonstrate the practical use of BREEDPLAN figures."

Jack Kennedy
Bumper Droughtmaster Stud

"BREEDPLAN figures on breeders have divulged a few secrets enabling the Bumper Droughtmaster herd at "Rockybank", Mitchell to be fine tuned to the environment.

The major point raised by Jack is that successful producers select breeding cattle that are suited to their environment and able to produce progeny that meet the specifications of the selected target market.

Other Northern cattle producers have mentioned the importance of milk production and mature cow weight in the environmental adaptation of their breeders. Producers running breeders in less favourable environments generally find they are more successful breeders than those with moderate milk production and moderate mature cow weight.

From the above points it should be noted that BREEDPLAN is not just a tool used to increase the 600-day weight of progeny. It is also a tool that allows cattle breeders to fine-tune genetics for economically important traits in their breeding cattle (fat, milk, mature cow weight etc) so they are able to meet their breeding objectives.

Christian Duff
Technical Officer,
Tropical Beef Technology Services
Phone: 07 4927 6066
The Australian Brahman Breeders Association (ABBA), as with other cattle societies, has opened up their primary (herdbook, registered) and secondary (calf recorded, commercial) registers via a web enquiry database. This powerful and easy to use search facility allows information to be accessed under four titles. These being:

1. Animal Enquiries - Any animal recorded on the ABBA database can be accessed under this search title. The search criteria includes animal name, stud book number, calving year, horned status, location etc.

2. EBV Enquiries - This search is basically the same as the animal enquiry search facility but it includes the added benefit of allowing you to search for animals that fit within a range of EBVs that suits your production system and breeding program.

3. Member Enquiries - ABBA member details can be accessed through this facility. The search criterion includes surname, stud prefix, stud number, postcode, zone etc. Members that fit the selected criteria will be displayed with their contact details.

4. Sale / Semen Catalogues - The details of many ABBA sales are included under this title throughout the year. The sale details are normally listed here well before they are available in hard copy form. This allows those interested to view pedigree and performance (EBVs) information on sale animals well before sale day.

The growth in use of the web enquiry database has been outstanding. In the 2002 - 2003. The ABBA web enquiry database was visited by 5263 unique computers with 211,097 transactions recorded. This is a 160% increase in pages displayed from the ABBA database in just three years (See figure 1).

The annual Rockhampton Brahman Week Sale (RBWS) has been regularly displayed on the online sale catalogue section of the web database facility. In the period the 2003 RBWS was posted on the online sale catalogue section it alone was visited by 685 unique users with 35008 pages of information viewed. To put this in perspective it represents 20 pages viewed by each unique user or 778 pages viewed per day leading up to the sale.

Commercial and stud producers alike are encouraged to use the web database search facility of their associated breed to help in their selection decisions. They can be accessed under the search facility title on the BREEDPLAN website (http://breedplan.une.edu.au)

For further information contact the relevant breed society, ABRI or myself.

Figure 1 - Use on ABBA web enquiry database.
Towards maternal multibreed EBVs

From 1997 to 2002 the MLA* funded, Southern Multibreed experiment, was conducted at Hamilton Victoria, (pictured below) and Struan (SA) research centres. There were also many cooperating commercial properties. This work provided data for Australia’s first multibreed adjustment table in early 2003. This table allows the birth, growth and carcase wt EBVs of Poll Hereford/Hereford, Angus, Limousin and Simmental to be put on the one base. (See BREEDPLAN News 2003 or http://breedplan.une.edu.au).

Since then, industry organisations have sought funding from MLA to carry on the F1 females to generate data for maternal EBVs. MLA has responded to this and I am pleased to report this work is underway. Over 300 F1 females from P/Hereford and Angus cows by Angus P/Hereford, Limousin and Simmental sires have been retained. These have been joined by AI to Shorthorn, Charolais and Limousin sires with high accuracy EBVs and links to other projects such CRC work (page 11). As well as collecting the maternal data, this should enable Shorthorn and Charolais to be added to the Multibreed adjustment table.

Brian Sundstrom

Final report - Belmont crossbreeding program

The Final Report on the ”Belmont” Crossbreeding Project, which analysed performance of a range of breeds and crosses under low to moderate sub tropical environmental and parasite stress, has now been completed.

From 1992 -97, the project generated 2,600 animals from 30 breed groups and their crosses, and measured a range of production and adaptation traits. The project estimated the optimal breed composition for a range of production systems and breeding objectives.

This confirmed industry expectations regarding needed higher content of adapted (Bos indicus) genetics at higher stress levels. The best way to achieve this depends on what traits are important, and what parasites are present.

Summary and full reports are available from Kishore Prayaga at the Tropical Beef Centre, Rockhampton.

kishore.prayaga@csiro.au

Rob Banks

Genetics Research Co-ordinator, MLA

Extending the value of genetic technologies

Recently MLA sponsored a National Beef Genetics Extension Team to recommend ways of speeding up genetic improvement in the Australian beef industry, MLA is concerned that although we have world class genetic technologies, genetic progress in herds is not fast enough.

Earlier this year the Management Committee of the Extension Team - Don Nicol, Bob Freer and myself - delivered to MLA a 'Foresight Plan' suggesting initiatives to fast-track genetics extension. In the next year you will see initiatives from this plan, including a series of Beef Genetics Expos. Contact me for times and locations. One constraint to adoption of genetic technologies we identified, was the need for better ‘proof’ that they deliver more profit to breeders and members of the supply chain.

A 'Proof of Profit' workshop was therefore conducted, where breeders, researchers and extension people presented information on their ‘pet’ genetic technologies, highlighting the profits and proof they work. Technologies ranged from EBVs and indexes to crossbreeding, gene markers and TGRM (Total Genetics Resource Management). The workshop concluded that for technologies such as EBVs and crossbreeding there is a wealth of information demonstrating their effectiveness, but this has not been well publicised. Participants therefore strongly urged continuous demonstrations of EBVs etc working.

The Proof of Profit workshop was the start of a process to develop material to use in promotion. We are also looking for ‘champions’ prepared to say the technologies work. If you or a bull buying client have a good news story, we would love to hear from you. Genetics affects the whole supply chain so if you know a lotfeeder or processor prepared to speak out, we would be keen to talk to them - we need a pull through effect from the processing end.

In the next issues of BREEDPLAN News we will publish outputs from this project - stories demonstrating that genetics work. If you have any comments or would like to volunteer a 'champion' or just good story please let me know. wupton@pobox.une.edu.au or write to AGBU, UNE, Armidale 2351.

Wayne Upton

AGBU

http://breedplan.une.edu.au
Regional growth path studies

A major project for CRC II, is a study of ‘best bet’ regional combinations of genotype and nutrition. There are four sites across southern Australia, (Struan, South Australia, Wagenup in WA, Hamilton Victoria and Griffith, NSW). They are each testing nutritional options relevant to their region, allowing lines of steers of different genetic potential (for carcase type) to be grown at different rates, and finished for various markets.

The NSW site is “Bringagee” station (Ag Reserves Australia), near Griffith.

Groups of 500-700 Hereford cows have been involved at each of 5 matings for Spring and Autumn calving groups, to the following Sire types.

- Angus - High Yield % EBVs (Ay)
- Angus - High IMF % EBVs (Am)
- Angus - High Yield % and IMF % EBVs (Aym)
- Wagyu Black and Wagyu Red
- Charolais and Limousin

After weaning, the steer progeny either follow High or Low growth paths to reach 400kg av feedlot entry (Cargill’s Wagga) at either 13 or 19 months of age. In spring 2003, they completed 4 of the 5 weanings and the second slaughter. The drought has forced some of the cattle to be dispersed during 2003, many to Grafton Research Station.

The last issue of this newsletter gave some birth and weaning data. This time we look at some early carcase results (table 1) for the Angus breed groups in NSW. For the European and Wagyu crosses, the numbers are a little low for publication at this stage and only general comments are made. The results have not had final adjustments and are provided here to show some trends.

The first pleasing trend is that the Angus sire carcase EBVs for yield% and marbling, seem to be predicting outcomes well (table 1). The European crosses are showing expected higher yield% and lower marbling trends. The Wagyu crosses, perhaps a little surprisingly to some, have yield%, marbling and eating quality scores similar to the Angus crosses. This seems to endorse industry experience that short fed, first cross Wagyu X lower marbling breeds, do not display high marbling.

As these projects progress, further information can be obtained from the project leaders indicated: Struan*, South Australia mick.deland@saugov.sa.gov.au, Hamilton* Victoria john.graham@agric.vic.gov.au and Griffith, NSW john.wilkins@agric.nsw.gov.au

* Also project leaders for multibreed work, Pg 10.

- The Pestivirus vaccine developed in early CRC research by NSW Agriculture, has been commercialised by CSL and was launched at CRC HQ in Sept ’03. There are applications in breeding herds and feedlots.
- Flighty heifers harder to AI. CRC research on flight time and its effect on meat quality and steer performance, has been in previous editions of this newsletter. A recent correlation with flight time reported by Northern CRC research team, is that fast flight time heifers display oestrus less clearly for AI.

In brief - other CRC research

- The Pestivirus vaccine
- Flighty heifers harder to AI.

Table 1 - Raw averages for progeny of three angus sire lines, from Hereford cows.

<table>
<thead>
<tr>
<th>Angus sire line</th>
<th>AY</th>
<th>AYM</th>
<th>AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield %</td>
<td>67.8</td>
<td>67.5</td>
<td>67.0</td>
</tr>
<tr>
<td>IMF%</td>
<td>4.1</td>
<td>5.1</td>
<td>5.8</td>
</tr>
<tr>
<td>MSA Eating score</td>
<td>62</td>
<td>68</td>
<td>69</td>
</tr>
</tbody>
</table>

- Flights after feedlot finishing.

http://breedplan.une.edu.au