SmartGene for Beef Results Released

The results from the SmartGene for Beef project were released in August 2008 at a seminar in Brisbane. The SmartGene for Beef project was a collaborative R&D project between Catapult Genetics, Beef Genetic Technologies CRC, the Animal Genetics and Breeding Unit (AGBU), the Agricultural Business Research Institute (ABRI), Meat and Livestock Australia (MLA), Cornell University and Breedlink Pty Ltd. The Queensland Government also provided co-funding.

The major objective of the SmartGene for Beef project was to enhance the accuracy of BREEDPLAN Estimated Breeding Values (EBVs) by developing the methodology to incorporate gene marker information from DNA tests into the calculation of the EBVs. As part of this objective, SmartGene for Beef also evaluated the relationship between the 12 gene markers available from Catapult Genetics for tenderness, marbling and feed efficiency and the observed performance of animals within the CRCI & CRCII projects, plus the Durham Shorthorn and Angus Progeny Test programs.

The major results from the SmartGene for Beef project were:

<table>
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<tr>
<th>Tenderness</th>
<th>Of the four tenderness markers available, two showed consistent effects on meat tenderness in British breeds &amp; three in Tropical breeds.</th>
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<tr>
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<td>The tenderness markers account for 4% of phenotypic variation in meat tenderness in temperate breeds and 6% in tropical breeds.</td>
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<td></td>
<td>Reliable estimates could not be calculated for Shorthorn due to extreme gene frequencies. In Hereford, only one tenderness marker had a significant effect on meat tenderness.</td>
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<td>Marbling</td>
<td>The marbling markers did not have a significant or consistent effect (when evaluated either individually or as a combined panel) on either IMF, MSA marble score or AUSMEAT marble score in any of the populations tested.</td>
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<td>Feed Efficiency</td>
<td>Only two of the feed efficiency markers showed a significant effect on net feed intake in the population in which they were discovered (CRCI temperate animals). Feed efficiency markers were insignificant in other populations tested.</td>
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<td></td>
<td>In the CRCI animals, the feed efficiency markers accounted for 1.8% of the phenotypic variation in net feed intake.</td>
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<td></td>
<td>Reliable estimates could not be calculated for Brahman as gene frequencies were extreme in 3 of the 4 feed efficiency gene markers.</td>
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Full results from the SmartGene for Beef project are included in the attached brochure. Complete scientific results are also available on the AGBU website (http://agbu.une.edu.au).

Any member that wishes to discuss these results in more detail or the implications of these results on the application of gene markers within their breeding program is encouraged to contact staff at SBTS or TBTS.
**Gene Markers Incorporated into BREEDPLAN EBVs**

As an outcome from the SmartGene for Beef project, the Animal Genetics & Breeding Unit (AGBU) has developed the methodology to combine the pedigree and performance information of an animal with gene marker information to calculate a single marker assisted EBV (EBVM). This is a first in the Australian beef industry and represents a significant advancement in genetic evaluation in this country.

Gene marker information will only be included in the calculation of EBVMs when independent industry validation has demonstrated that the gene marker is useful for genetic evaluation. Furthermore, the contribution that the gene marker makes to the EBVM is likely to differ between breeds and will be determined by industry validation for such things as the frequency and phenotypic effect of the gene marker in that breed.

Based on the SmartGene results, only the gene markers for tenderness will be included in the calculation of any BREEDPLAN EBVs at this stage. There is currently no justification to include either the marbling or feed efficiency gene markers in the calculation of the BREEDPLAN IMF or Trial NFI EBVs respectively.

**Trial Tenderness EBVMs Released**

Trial Tenderness EBVMs were released for the Australian Brahman Breeders Association at Brahman Week in early October. The Trial Tenderness EBVs were produced for a total of 22052 Brahman animals. These were the first EBVs released in Australia that combined pedigree and performance information with gene marker information when calculating the EBVs.

Three different sources of information were used when calculating the Trial Tenderness EBVMs. The first source of information was shear force measurements, an objective measure of meat tenderness. To measure shear force, meat samples are collected from the carcase of an animal and the amount of force required to pull a mechanical blade through the meat is measured in a laboratory. The second source of information was the gene markers for tenderness, while the last source of information was flight time measurements. Flight time is the time taken for an animal to travel approximately 2.0 metres after exiting the crush, as measured by two light beams. While not a direct measure of tenderness, tropically adapted cattle with slower flight time (i.e. better temperament) have been shown to have more tender beef.

![Figure 1 – Information used to calculate Trial Tenderness EBVMs](image)

Further information on the Trial Tenderness EBVMs are available from the Tip Sheet page in the Technical area of the BREEDPLAN website (http://breedplan.une.edu.au). A more detailed technical document is also available from the SmartGene area of the AGBU website (http://agbu.une.edu.au).
Staff Update – New TBTS Technical Officer

In September 2008, TBTS welcomed a new full time technical officer in Philip Mann. Philip will initially be based in Armidale for intensive training at the ABRI before relocating to the Rockhampton office in Brahman House at the start of 2009.

Philip brings a wealth of practical experience in breeding tropical cattle. This stems from past employment as manager of an integrated oil palm and beef operation in Papua New Guinea where a 1700 head breeding herd was vertically integrated with a 1300 head feedlot, an abattoir and retail outlets. He also grew up and worked on his family’s beef breeding and fattening operation in coastal Central Queensland.

To complement his practical background Philip also carries outstanding academic qualifications, holding a degree in Bachelor of Applied Science (Rural Technology) with honours from the University of Queensland, Gatton. At the completion of his degree he was awarded the college medal for outstanding academic achievement.

From January, Philip can be contacted by phone on (07) 4927 6066 or via email on philip@tbts.une.edu.au.

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Enhancements to BREEDPLAN software

A number of enhancements will be implemented shortly to the BREEDPLAN software that is utilised by most breeds. These enhancements have been scheduled for implementation over the coming year. The enhancements will all result in the calculation of improved BREEDPLAN EBVs and are part of the normal evolution of the BREEDPLAN software.

| New analytical software | The increasing size of databases and the computational demands of the GROUP BREEDPLAN evaluation have required the development of more efficient analytical processes. The “solver” program is the statistical software behind the BREEDPLAN analysis that calculates the EBVs. An updated “solver” program has been developed that has quicker processing speed (ie “works faster”) and makes better estimates of the breeding values, particularly for animals with limited performance and pedigree data. |
| Improved calving ease analysis | The calving ease analysis has been modified to include additional depth in the pedigree information. This is to overcome limitations in pedigree structures that are associated with incomplete recording of calving difficulty scores. Calving Ease EBVs will change significantly for some individual animals. |

Several other changes will also be implemented in some breeds such as re-estimated adjustment factors and genetic parameters, revised handling of overseas EPD information and updating of the genetic base to a more recent group of animals.

Complete details of the enhancements that will be implemented in each breed and the effect of these enhancements will be forwarded to the members of that breed at the time of implementation. In the meantime, any member with queries should contact staff at SBTS or TBTS.
“Closer to Your Clients” Workshops a Huge Success

Eleven seedstock enterprises have hosted a workshop for their clients in 2008 as part of the “Closer to Your Clients” workshop series. The workshops have been conducted across Australia and have attracted a combined audience of over 400 people.

Workshops have been hosted by the following seedstock enterprises.

- Lindsay Murray Grey Stud
- Bowen Poll Hereford Stud
- Wirruna Poll Hereford Stud
- Woolcott Shorthorn Stud
- Elite Poll Hereford Stud
- Gyranda Santa Gertrudis Stud
- Wightfields Santa Gertrudis Stud
- Melaleuca Murray Grey Stud
- Yavenvale Hereford Stud
- Yarram Shorthorn Stud
- Mawarra Hereford Stud

A workshop will also be conducted shortly at Monterey Murray Grey Stud, while Delamere and Mount William Charolais Studs will jointly host a day in late November.

The SBTS & TBTS team wish to commend all the above producers on their excellent facilities and warm hospitality, which contributed to making the days a great success. Any other seedstock herds interested in hosting a workshop are encouraged to contact staff at SBTS or TBTS to register their expression of interest. Additional information on the “Closer to Your Client” package is also available on the SBTS website (http://sbts.une.edu.au) and TBTS website (http://tbts.une.edu.au).

Client Days in Action: (1) Bob Freer discusses bull selection at Yarram Shorthorns, (2) Participants at Melaleuca Murray Greys study the EBVs, (3) Interested onlookers inspect bulls at Wirruna Poll Herefords.