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Travel assistance to attend ICAR Conference

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Participation by Dr Peter Parnell in the International Committee for Animal Recording (ICAR) Conference, Cork, Ireland 28th May – 1st June, 2012

The purpose of attending the ICAR conference was to gain an insight into international developments in beef cattle genetic evaluation and to assist in maintaining linkages with the network of international scientists, commercialisers and service providers involved in beef cattle breeding. Funding assistance to travel and attend the conference was offered by MLA in return for this report on key findings and recommendations.

The ICAR conference included a total of over 500 participants, of which an estimated 100-150 are involved in beef genetic improvement. Most countries in the world involved in livestock production were represented, with most delegates coming from Ireland, UK, other European countries and North America.

Of particular interest to Angus Australia was to identify and explore potential innovations to improve its genetic evaluation systems, and to seek opportunities and ideas for implementation in Australia to enhance the rate of genetic improvement in member's herds e.g. developments in genomics technologies, methodologies for computation of EBVs and Indexes, screening recessive genes, expanded trait recording, communication methods and tools to enhance adoption of genetic technology.

A paper was presented at the ICAR conference titled "Genetic improvement strategies and successes by Australian Angus breeders". This paper described the overall current genetic trends achieved by the Angus breed in Australia, and trends achieved by some leading breeders. It demonstrated that whilst substantial gains have been made, significant potential exists to increase the rate of genetic improvement beyond the levels achieved during the past decade.

In addition, a component of a paper was presented (for Dr Robert Banks) with Dr Arthur Rickards titled "Organisational models for Beef Recording and Genetic Evaluation in Australasia, the Americas and Southern Africa".

Key observations:

- ICAR members are at the forefront in the recording, genetic evaluation and implementation of designed breeding programs for the dairy cattle improvement.
- INTERBULL provides a successful model for international cooperation for dairy cattle genetic evaluation and information exchange. INTERBULL uses the MACE (Multiple-trait Across Country sire Evaluation) methodology, where traits in different countries are considered as correlated traits and corresponded to de-regressed national EBVs of bulls.
- INTERBULL participants are involved in a wide range of collaborative R,D &E contributing to genetic improvement in dairy cattle (i.e. beyond to simply co-operating in international genetic evaluation) including but not restricted to advancing methodologies for the modeling of performance and genotype data.
- INTERBEEF, for global beef genetic evaluation, is currently being established with numerous beef improvement organisations (breed associations, government agencies) across Europe and South Africa already enrolled and submitting pedigree and performance data. There is currently no enrolments in INTERBEEF from key beef producing countries such as USA, Canada, Australia or South American countries.
- INTERBEEF requires pedigrees and performance data to be uploaded to a central global database for genetic evaluation (in contrast to INTERBULL for dairy, which uses de-regressed national EBVs generated by other service providers). As such, INTERBEEF will

be effectively a direct service provider and in direct competition with other genetic evaluation providers (e.g. Breedplan, Angus Genetics Inc.). This will be an impediment to future expansion of INTERBEEF to incorporate data from major beef producing countries beyond Europe.

- The genetic evaluation model proposed to be used by INTERBEEF appears to be relatively unsophisticated (e.g. compared to models used by Breedplan, AGI or American Simmental), and initially restricted mainly to simple growth traits. The first INTERBEEF global genetic evaluation analysis is proposed to occur in September 2012 (although potential for delays were evident).
- There is a recognition among INTERBEEF participants of the need for greater standardisation of phenotypic trait definitions across countries e.g. condition score, type evaluations.
- INTERBEEF has a limited annual budget of approx. €100,000, and the fee structure for participants is currently under review. Hence, future costs for involvement is currently unclear.
- INTERBEEF is considering the implementation of an option for uploading pedigree information, without performance data, to generate an international repository for pedigree checking, international identification checking etc. This could be a very useful global resource of benefit to non-core INTERBEEF participants.
- The INTERBEEF network provides a potentially valuable forum for ongoing exchange of ideas and development of international collaborations for beef cattle research and development, pedigree checking, genotype and data exchange, and for prospective development of international beef genetic evaluation and improvement programs.
- Presentations provided at the ICAR conference indicated that USA will be a significant source of new genetics/genomics knowledge in the future based on the substantial level of R&D currently being conducted (this was further confirmed in a subsequent visit to several research institutes and commercial genotype providers in USA).
- Beef breeding objectives in Europe have been strongly influenced by market signals for lean beef production, with little or no emphasis on meat quality. Hence, in recent decades beef breeding populations have been dominated by high yielding "Continental" breeds such as Limousin and Charolais at the expense of traditional "British" and native cattle breeds. Breeding objectives for all breeds have been very similar such that there appears to have been significant convergence of the diversity between breeds.
- In the past 5-10 years some segments of the beef industry in both UK and Ireland have shown renewed interest in the production of higher quality beef, with a resurgence of the popularity of the Angus breed in particular (following a global trend of premiums for Angus).
- A small number of Angus breeders in Ireland (to a lesser extend in UK) have specialized in producing bulls for use in the dairy industry. In these herds the major selection priority has been on low birth weight / calving ease, which is in direct contrast to breeders competing with Continental breeds in the cow-calf suckler industry.
- Exemplary levels of co-operation exist between various industry stakeholders involved in beef genetic improvement in Ireland (cattle breeders, breed associations, AI organisations, scientists, advisors, veterinarians, livestock marketers, meat processors, Irish Cattle Breeders Federation, and farming press) and State stakeholders (Department of Agriculture, Food and the Marine; Teagasc; Universities; and Animal Health Ireland). Strategic investment and provision of financial incentives from the State has helped facilitate this co-operation. It is a concern for the Irish beef sector that current financial pressures on the economy may jeopardise levels of State financial support to the industry in the near future.

Recommendations:

- Australia should maintain representation on ICAR/INTERBEEF committees in order to continue dialogue on global co-operation in beef improvement and to ensure that beneficial opportunities for future international collaboration are not missed. This representation should be at a high level and appointed and supported by MLA.
- It would be beneficial for key Australian organisations involved in beef genetic improvement, at least for temperate Australia (such as ABRI, AGBU, major breed associations) to be involved in future ICAR conferences to maintain linkages with the European/global beef industry.
- There appears to be very little benefit for major Australian beef breeds to participate directly in INTERBEEF genetic evaluation. However, the development of INTERBEEF should be carefully monitored to determine if at some point in the future it would be beneficial to invest in direct involvement with the program.
- The evolution of beef organisations and service providers in Ireland and other parts of Europe, and North America (including the demise of some), reinforces that viable business models are required for sustainable provision of genetic improvement services. In some cases this requires consolidation or organisations and services.
- Specific technologies of potential benefit to the Australian beef industry which should be explored further include the following:
    1. Calculation and publication of linear sub-indices for fertility, carcass, feed costs etc (as components of overall market based genetic indexes)
    2. Implementation of a preference survey approach to validate the applicability of current genetic indexes
    3. Targetted genotyping project to assemble a large number of 770k and 50k SNP genotypes on key beef animals

Angus Australia intends to pursue the following:

1. Potential to link with the INTERBEEF pedigree database for checking international Angus pedigrees.
2. Direct linkage with generic genotyping laboratories for high density SNP analyses with use of in-house prediction equations (to reduce costs for members to utilise genomics), as used by ICBF.
3. Development of a proposal to conduct a preference survey study to evaluate Angus Australia's genetic indexes as computed via BreedObject.
4. Implementation of transparent tracking of member service requests (data entry, DNA test requests) such as used by ICBF.
5. Encouragement of additional bulls from UK / Ireland to nominated for use in the Angus Sire Benchmarking Program (Angus BIN) in order to sample available genetic diversity in these countries (already 3 UK bulls, nominated by ABS Global, have been used in the first 2 cohorts).

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