# DETAILING A BEEF GENETICS EXTENSION STRATEGY

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## SUMMARY

There has been a substantial increase in knowledge of the genetics underlying profit traits in Australian beef cattle. Implementation of such knowledge in breeding programs presents a significant opportunity to increase the rate of genetic gain. Current rates of genetic gain vary greatly between seedstock breeders, both within and between breeds. Commercial producers' preparedness to pay more for bulls with higher genetic merit is an important factor influencing the rate of genetic gain in seedstock herds. Meat and Livestock Australia commissioned the development of a beef genetics extension strategy focused on effective extension to various segments within the beef industry. The strategy is to focus on 1) improving knowledge amongst commercial producers to enable them to appropriately assess the value of genetic merit, thereby increasing the demand for genetically superior bulls; and 2) providing bull breeders with information to assist them in increasing the rate of genetic gain in their herds to meet the projected increased commercial demand.

## INTRODUCTION

Genetic improvement allows for beef producers to increase the productivity and profitability of their enterprises and quality of their stock. The success of genetic improvement is determined by the rate of genetic improvement being achieved by seedstock enterprises and the proportion of commercial bulls that are purchased from programs achieving high rates of genetic improvement.

There have been substantial R&D efforts in beef genetics in Australia (ongoing). These have led to significant increases in understanding of the genetics underlying economically important traits and the development of DNA technology. With this knowledge and technology there is potential to significantly increase the rate of genetic gain. However, the benefit of these research outcomes is only realised when seedstock breeders utilise the technology to achieve genetic gain in a direction that will increase value chain profit. To date only a small proportion of beef genetics investment in Australia has focused on facilitating greater rates of genetic gain in the seedstock sector through adoption and effective use of BREEDPLAN. This has led to lower than optimal adoption of the technology resulting in a slower rate of genetic gain than is considered technically feasible, particularly in northern Australia (Fennessy *et al*. 2014).

Rates of genetic gain vary greatly between seedstock breeders, both within and between breeds. This is partly attributed to poor price signals from commercial producers with regard to their preparedness to pay more for bulls with higher genetic merit. Lack of commercial producer price signals is associated with ineffective proof of profit messages and a low appreciation by commercial producers of the role genetics has for enterprise productivity, product quality and profitability. The primary objective of the proposed extension strategy is to increase the rate of genetic gain and thus profitability for beef producers. Focus is given to creating demand in the commercial sector and facilitating increased rates of genetic gain in the seedstock sector.

## MATERIALS AND METHODS

Over 40 stakeholders involved in beef cattle genetics extension and implementation were interviewed by the project team during the consultation phase with additional opportunity for input at a facilitated workshop for stakeholders. Stakeholders engaged in the development of the strategy included genetics extension specialists, researchers, bull breeders, commercial producers, pastoral

companies, breed society representatives and those involved in delivery of genetic evaluation and extension in Australia. The consultation focused on documenting current genetics extension and implementation efforts, identification of gaps and opportunities and exploring strategies to address the gaps and harness the opportunities. In addition to consultation, numerous industry reports of genetics implementation were considered in the development of the strategy.

## RESULTS AND DISCUSSION

Six primary recommendations are detailed below.

**1. Demonstration that genetics works with compelling proof of profit.** Throughout the consultation there was consistent feedback on the need for the development of compelling proof of on-farm profit messages. This need was also highlighted by Freer *et al*. (2003) and more recently by Fennessy *et al*. (2014) who recommended, "Investment in generation of robust data to show the benefits of genetic improvement in commercial settings." It would be ideal to see the recommendation of Fennessy *et al.* (2014) adopted but this would be accompanied by substantial cost and a time lag to demonstration, particularly for reproductive rate. Two alternative and complementary approaches are suggested, one utilising research herd data sets and the other working closely with existing breeders who have achieved demonstrable improvement in genetic merit to demonstrate the value of genetic improvement.

*Research herd data sets*. It is recommended that recent research outputs be reviewed and on-farm productivity and proof of profit messages established for model farms based on differences in weaning rate, growth rate, carcass quality (and feed intake where available) that were observed for animals differing in genetic merit (teams of sires, divergent selection lines etc.). This task should be undertaken by a small team with expertise in livestock genetics, agricultural economics, livestock extension, science communication and marketing. Metrics including productivity (e.g. kg/Ha), cost of production ($/kg), turn off age, carcass quality (Meat Standards Australia Index and component traits), and return on investment (to-farm-gate value of genetic improvement) should act as a base when developing the messages and examples.

*Industry case studies*. The use of the industry based case studies is focused on a producer advocate approach. This approach will help facilitate the communication of messages and outcomes to commercial beef producers. These case studies will involve the development of detailed productivity and profitability outcomes through improvement in genetic merit with a longitudinal component (i.e. not once off). Case studies would ideally document the change in genetic merit achieved and associated increases in productivity (e.g. increased weaning rate, shorter time to turnoff, improved carcass quality) and income. Where possible such case studies should be undertaken in multiple regions and breeds to overcome any suggestions that the results are not applicable to particular geographic regions or breeds. Case studies should also detail the bull selection strategy employed by the seedstock enterprise to achieve the gain they have.

**2. Assistance and advice to seedstock breeders.** Is it expected that bull breeders new to BREEDPLAN will need assistance in understanding aspects of performance recording and genetic evaluation. Important concepts include contemporary groups, effective records, data integrity, and methods for performance recording. Whilst much of this material can be found on Southern Beef Technology Services (http://sbts.une.edu.au/, SBTS) and Tropical Beef Technology Services (http://tbts.une.edu.au/, TBTS) websites, it is essential to ensure seedstock breeders embarking on performance recording do not become disenfranchised early due to suboptimal recording methods. Support needs to be primarily targeted to seedstock breeders in northern Australia where current use of BREEDPLAN is lower than in southern Australia. Support from TBTS and local industry

service providers (on-the-ground) is likely to be required. There are currently few sufficiently experienced and available people in northern Australia to undertake this work at a local level. Through the genetics extension network (Recommendation 5) people will be identified and trained so they can fill the role of local service provision for this recommendation.

**3. Influential breeder support**. When investigating population structure within breed, Amer (2014) identified that approximately 60% of herds do not supply sires to other breeders and those herds that do disseminate genetics to seedstock herds tend to have higher genetic merit. Nucleus herds are defined as herds that combine superior genetic merit and high rate of genetic gain with wide dissemination of genetics. These herds should be supported to increase their progress because of the multiplier effects on the value chain.

*Approach.* Engagement of nucleus herds in R&D and the AGBU Influential Breeder Workshops is common practice. It is recommended that on a periodic basis (e.g. 3 years) an analysis is undertaken to identify which herds within and across breeds are the most influential with the aim of supporting current influencers (i.e. identification of nucleus herds). Two complementary approaches to engaging with these breeders are outlined:

a) Involvement in AGBU Influential Breeder Workshops: herds continue to be involved in the AGBU Influential Breeders Workshop to ensure the breeders are up-to-date with current R&D outcomes and understand how they can best utilise new technology.
b) Ensuring nucleus herds are involved in genetics R&D: Many influential herds are already involved in R&D. Where possible this should be maintained and/or expanded. There are industry benefits observed including:
    - influential breeders tend to be strong advocates for BREEDPLAN and genetic evaluation
    - they have extensive client training initiatives to highlight the benefits of genetic gain for beef producers and
    - animals in nucleus herds can inform genetic evaluation for other animals in the breed for new traits developed from R&D

**4. Enhanced value chain relationships.** The implementation of carcass feedback for predicted eating quality via Meat Standards Australia (MSA) Index to producers, and the use of carcass optimisation by processors provide an opportunity for clear links between improving genetic merit, increasing carcass quality and higher price received. The MSA Index is a weighted average carcass MSA score calculated from scores for individual cuts and cut weights (Watson *et al*. 2008). Recent developments in carcass optimisation allow processors to identify and segment carcasses with higher predicted eating quality so that more four and five star cuts can be marketed at substantial premiums. Market signals now exist such that carcasses with higher MSA Index attract higher price received. Two initiatives are proposed; i) continued work with beef processors to capture and value economic benefit from carcasses with higher predicted eating quality; and ii) development of tools to enable beef producers to evaluate the importance of genetic improvement on carcass quality and thus price received ($/kg). This approach is expected to facilitate clearer price signals, such that carcasses with superior predicted eating quality attract higher price received. This will provide an incentive for producers to seek bulls with superior genetic merit for eating quality and appropriately value them in addition to production traits.

**5. Establish a livestock genetics extension network for training and coordination.** There are many parties involved in beef genetics extension. A strong message from the consultation was the need for coordination of beef genetics extension. It is suggested that a national genetics extension network be established for the beef genetics service provider sector. The purpose of the network would be multifaceted and include:

a) Training opportunity for people involved in direct-to-producer beef genetics extension;
b) Greater awareness/coordination of the range of direct-to-producer activities occurring that have a genetic component;
c) Greater awareness of current R&D and tool development;
d) Mechanism for forming messages, providing updates and developing extension material;
e) Greater facilitation of feedback from bull breeders and commercial producers to extension agents and those undertaking R&D (a recommendation from Moreland and Hyland 2013); and
f) Planning and implementation forum.

A well-functioning genetics extension network should lead to consistent messages to industry, common extension material, and common delivery of programs. An overall aim would be that there is a high likelihood that someone in the genetics extension network would provide the same advice and recommendations to a seedstock or commercial producer for breeding program or bull selection as the next person; or identify the appropriate person for the producer to contact.

**6. Market research.** BREEDPLAN is an established technology that can demonstrably be used to inform animal selection and achieve genetic gain associated with greater profit for both beef producers and the wider beef value chain. Despite this, the rate of adoption and effective use of genetic evaluation to inform animal selection remains below potential. At the stakeholder workshop, there was considerable support for the engagement of a market research company to investigate barriers to adoption and to develop communication solutions to address such barriers. It is therefore recommended that a specialist market research company be engaged to investigate and report on: i) industry characteristics and barriers to adoption of genetic improvement programs at both the seedstock and commercial level; ii) key influences on decision making processes and how to leverage them; and iii) opportunities for improvement in the communication and marketing of BREEDPLAN and the economic benefits realised through genetic improvement.

**Measures of success.** Those consulted in the development of the strategy agreed that the success of the strategy can be measured against the following criteria listed. By 2020-
a) Performance: 50% increase in the rate of genetic progress as measured by weighted average of selection indexes for each breed society compared with 2012 base year, i.e. increase from $4.68/year to $7.02/year in southern Australia and $1.04/year to >$1.56/year in northern Australia;
b) Penetration: 25% of bulls used in commercial matings in northern Australia and 75% in southern Australia will have BREEDPLAN Estimated Breeding Values;
c) Establishment of national genetics extension and consulting network.

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