Contributed paper

IDENTIFYING THE BREEDING PREFERENCES AND ATTITUDES OF THE AUSTRALIAN BEEF CATTLE PRODUCER

J.E. Peart[1], A.I. Byrne[1], M.J. Reynolds[1] and C.J. Duff[1]

[1]Angus Australia, Armidale, NSW, Australia

SUMMARY

This study, through the method of quantitative survey, investigates bull selection criteria preferences and understanding of genetic technologies of Australian beef producers and breed utilisation within their operation. The survey captured 1,023 producer responses from a representative proportion of beef cattle businesses in each state. Participants were asked to value bull selection criteria preferences on a 1 (lowest value) to 10 (highest value) scale. Respondents were also asked to rate their knowledge of genetics and nominate their breed of choice utilized in their operations. Nationally, temperament was ranked the most valued bull selection criteria, followed by polledness, visual appraisal and BullCHECK. The results were relatively consistent between states. Angus was the dominant breed in the female breeding population, with 5.6 million head (48%) of the Australian breeding female herd influenced by Angus genetics. Members of breed societies, particularly Angus Australia members, rated their knowledge of genetics more highly than their non-member counterparts.

INTRODUCTION

The development and commercialisation of genetic selection tools have provided an accurate and objective description of genetic merit upon which producers can select breeding candidates and achieve breeding objectives (Johnson 2007). It is commonly recognised that Angus genetics and associated genetic technologies (e.g. Estimated Breeding Values, genomics) have made a significant contribution to the wider beef industry in terms of lifting productivity through gene introgression and genetic gain for commercially relevant traits (Parnell 2015). However there have been few wide scale studies that have been formally undertaken to understand producer perception and utilisation of these technologies.

Quantifying producer knowledge in genetics and the emphasis that they attribute to the objective information available for selection identifies extension and development opportunities for applicable genetic tools and technology (Bell *et al*. 2019). To provide this knowledge, Angus Australia facilitated a study by way of quantitative survey methodology via an independent market research group. The study aimed to determine the level of penetration of Angus and Angus influenced genetics throughout Australia, in addition to gauging beef producer's knowledge and attitudes towards the available genetic technologies, the latter being the focus of this paper. The broader findings of this study have been extensively reported in the Australian Beef Breeding Insights report (Angus Australia 2020).

MATERIALS AND METHODS

The independent research market group Chi Squared was engaged due to their experience in agricultural market research and primary producer focus. A quantitative survey process was conducted over a 50-day period (11th May to 30th June 2019) and gathered 1,278 responses through four streams;

1. Telephone interviews conducted by an Australian based call centre, consisting of retired producers and agricultural students;
2. Online survey promoted via email correspondence to the Crackerjack Farming database;

3. Online survey promoted via email correspondence to the Angus Australia membership;
4. Online survey promoted via the Angus Australia website and Facebook page

To ensure the survey captured responses that were representative of viable beef breeding enterprises across the wider beef industry there were disqualifying parameters put in place. These included;

- Herd size less than 20 head of breeding females;
- Participant younger than 18 years of age;
- Less than 3 years of experience;
- Participant wasn't actively involved in the management decision making process of the operation;
- Main enterprise did not involve breeding or trading;
- Participant didn't intend to be breeding cattle in 5 years' time

This ultimately resulted in 1,023 eligible, unique responses. Sample size was monitored to ensure that the proportion of responses was comparable to the proportion of beef producing business entities in each state, as reported by the Australian Bureau of Statistics (Australia Bureau of Statistics, 2020). Due to the limited sample size of Northern Territory respondents, no values have been reported in this paper for this state.

Participants were asked a series of questions regarding their operations including knowledge of genetics (1 being poor, 10 being excellent), breed of choice and perceived value (1 of least value and 10 of greatest value) of selection criteria available when selecting bulls, such as EBVs.

In order to gain survey results that reflected the Australian beef industry, the bias of Angus members participating in the survey was corrected. This was achieved by removing those respondents who were contacted through the Angus Australia membership streams and focussing on the randomized data collection of the Chi Squared and Crackerjack farming databases. Overall, 781 responses formed the 'adjusted' data on which the breed influence findings in this study were based. Where findings are reported for the selection criteria preference and rating of genetic knowledge, respondents from all four streams were included.

RESULTS AND DISCUSSION

Bull selection criteria preferences. The results of the survey suggest that, overall, producers prioritise bull selection criteria related to fitness for purpose (e.g. temperament, polledness, visual appraisal and BullCHECK (Australian Veterinary Association (2007))) before criteria associated with genetic progress (EBVs, Pedigree, DNA enhanced EBVs, Selection Indexes) (Table 1).

These priorities were generally consistent across most states however there were some variations reflecting the difference between past experiences and education, production systems, profit drivers and climate. For example, producers in NSW placed higher importance on EBVs compared to raw data (e.g. weight, ultrasound scans) for bull selection, while this was opposite in Queensland.

The bull selection criteria related to DNA factors (e.g. sire/parent verification, enhanced EBVs) generally rated at the lower end of importance. This may be a result of the relatively recent availability of these selection criteria, particularly DNA enhanced EBVs for bull selection.

Selection indexes were consistently ranked the lowest importance criteria for bull selection. Further research is warranted to understand this outcome and determine strategies to increase the importance placed on selection indexes for bull selection.

Table 1. Importance rating of bull selection criteria nationally and by state

Selection Criteria	National	NSW	Qld	SA	Tas	Vic	WA
Temperament	9.3	9.3	9.3	9.3	9.7	9.3	9.3
Polledness	8.7	8.5	8.5	9.3	9.4	9.0	8.9
Visual Appraisal	8.7	8.7	8.6	8.7	8.7	8.9	8.7
BullCHECK	8.1	8.1	8.4	8.0	7.2	7.8	8.3
Information on genetic conditions	7.9	7.9	7.7	7.9	7.9	8.0	8.0
EBVs	7.6	7.7	7.1	7.6	7.1	7.7	8.0
Coat Colour	7.5	7.7	7.1	7.7	6.9	7.8	7.1
Pedigree	7.3	7.4	7.1	7.2	7.5	7.5	7.5
Raw data	7.2	7.1	7.4	7.4	7.2	7.2	7.0
Sire/Dam DNA verification	6.7	6.8	6.4	6.5	6.8	7.0	6.8
DNA enhanced EBVs	6.5	6.6	6.3	6.3	6.2	6.8	6.7
Selection Indexes	6.5	6.5	6.3	6.6	5.8	6.4	7.0

Ratings are an average value score of a 1 (of least value) to 10 (greatest value) scale

The value that Angus Australia members put on each selection criteria was generally higher than their non-member and other breed society member counterparts (Table 2). Their priorities generally reflected the national results however information of genetic conditions was rated more highly, resulting from exposure to some of the genetic conditions identified in the Australian Angus herd. Also of an elevated priority was coat colour, reflecting their breed preference. Selection indexes were also of the lowest value to this group of respondents.

Participants belonging to breed societies other than Angus Australia, placed the lowest value on polledness of the groups. Meanwhile, non-members, both Angus users and other breed users alike, placed least value on DNA enhanced EBVs and sire/dam DNA verification, reflecting the commercial nature of their operations.

Table 2. Importance rating of bull selection criteria by breed society membership

Selection Criteria	Angus Australia Members	Non-members		Other Societies Members
		Angus users	Other breeds	
Temperament	9.3	9.2	9.3	9.4
Visual Appraisal	8.9	8.5	8.5	8.8
Polledness	8.9	9.0	8.6	8.1
Information on genetic conditions	8.5	7.4	7.2	8.1
BullCHECK	8.3	7.9	7.8	8.3
Coat Colour	8.1	7.4	6.6	7.1
EBVs	7.9	7.5	7.1	7.4
Pedigree	7.8	6.8	6.8	7.6
Sire/dam DNA verification	7.7	5.9	5.7	7.1
DNA enhanced EBVs	7.2	6.0	5.9	6.7
Raw data	7.2	7.1	7.0	7.5
Selection Indexes	6.6	6.4	6.3	6.5

Ratings are an average value score of a 1 (of least value) to 10 (greatest value) scale

Genetic knowledge. Producers associated with a breed society rated their knowledge of genetics more highly than their non-member counterparts, with Angus Australia members having the greatest confidence in their knowledge of genetics (7.9), by comparison to members of other societies (7.4). Non-members of breed societies reported an average score of 6.4. When observed on a state basis,

Victoria and New South Wales had the highest averages (7.3 and 7.2, respectively), reflecting the greater Angus Australia membership base in those states.

Breed influence. Nationally, a total of 48% of females had some percentage of Angus influence in their breeding (Table 3). Angus was the most utilized breed in all states except Queensland.

The female beef cattle population figures for each state from the ABS Agricultural Commodities report for 2018-19 (Australia Bureau of Statistics, 2020) were used to extrapolate the breed findings of the survey. This resulted in an estimated population of 5.6 million head influenced by Angus genetics in Australia – with the largest populations of Angus females in Queensland (1.8 million head) and New South Wales (1.5 million head).

Table 3. Estimated proportion of Angus influenced females and extrapolated herd size by state

	National	NSW	Qld	SA	Tas	Vic	WA
Influence	48%	78%	32%	78%	53%	77%	40%
No. of head	5,606,199	1,461,977	1,824,097	311,002	104,382	768,429	425,927

CONCLUSIONS

The survey approach implemented in this study proved to be an effective method of identifying the breed and selection criteria preferences of Australian beef breeders. The representative nature of surveys is an obvious limitation however the robust number of participants lends credibility to the finding. The results suggest that producers value a bull's contribution to the current herd, such as their ability to join and produce a viable calf, alongside safety and welfare considerations, above selection criteria associated with genetic progress. The number of Angus influenced cattle in the Australian breeding herd, as well as the higher confidence of Angus Australia members in their knowledge of genetics, illustrate the magnitude that any advances in technology, performance and research can be amplified through engagement and extension with Angus breeders. It further illustrates the benefits that could be gained through similar extension activities in the wider beef industry.

ACKNOWLEDGEMENTS

We would like to acknowledge Meat & Livestock Australia, who, through a co-funded project, contributed financially to this report. We would also like to extend our gratitude to the producers who spent time and effort participating in this survey.

REFERENCES

Angus Australia (2020), https://www.angusaustralia.com.au/research/australian-beef-breeding-insights-survey/ (last viewed March 2021)

Australia Bureau of Statistics (2020), https://www.abs.gov.au/statistics/industry/agriculture/agricultural-commodities-australia/2018-19#data-download (last viewed March 2021)

Australian Veterinary Association (2007), https://www.ava.com.au/about-us/ava-groups/cattle/resources/schemes/bullcheck/ (last viewed on February 2021)

Bell AM, Byrne AI. Duff CJ, Dominik S. (2019) *Proc. Assoc. Advmt. Anim. Breed. Genet*. **23:** 508

Johnson D.J., (2007) *Proc. Assoc. Advmt. Anim. Breed. Genet*. **17**: 8.

Parnell PF (2015) *Proc. Assoc. Advmt. Anim. Breed. Genet*. **21**: 221.