

BREEDING PROGRAM DESIGN INITIATIVES

Tom Gubbins¹ and Wayne Upton²

¹Te Mania Angus, 'Pardoo', Colac, VIC, 3250

²Animal Genetic and Breeding Unit, University of New England, Armidale, NSW, 2351

SUMMARY

This paper highlights an example of a seedstock operation practically implementing technologies to improve the genetic advancement of its herd and the profitability of its clients. Gaining access to technology is just one side of the coin, using it to its best potential is the other.

The Te Mania Angus breeding program makes extensive use of BREEDPLAN and related technologies and is very focused on breeding seedstock that are the right genetics for the commercial beef supply chain. In 1995 Team Te Mania was created to help give the seedstock operation commercial focus while building client loyalty. Team Te mania is a partnership of some 36 herds mating 16,000 commercial Angus females annually. Benefits to commercial members include access to very high genetic merit sires at moderate prices and in return the Te Mania seedstock operation receives direct feedback on commercial herd requirements and the scope to conduct a sophisticated progeny test program.

Te Mania Angus has one of the fastest rates of genetic improvement when analysed by TakeStock, using an array of resources available to design and conduct a very effective breeding program. The result is that young sires with the Te Mania prefix are high indexing with high accuracies at a young age.

INTRODUCTION

The seedstock sector of the Australian beef industry is large and complex creating an extremely competitive environment in which to run a business. In order to succeed, a seedstock producer needs to pull out all the stops.

The challenge for any seedstock producer is to breed profitable animals for their clients. To do this they need to embrace all the technology that the seedstock producer sees as relevant and ensure that their system and processes are set up in such a manner as to utilize the technology to its maximum potential.

Client loyalty is very important to continued market share and there are many different approaches to gaining and maintaining that loyalty.

Te Mania Angus, as one of the largest seedstock businesses in the southern Australian beef industry, has chosen to promote its product based on genetic merit. To do so, Te Mania Angus has been at the forefront of the adoption of genetic technologies and strives to maintain constant genetic improvement.

Genetic merit is largely measured in terms of the published Angus long fed index (Japanese B3). Genetic merit for the whole beef supply chain is considered, hence the use of the B3 index that includes values for the commercial breeder plus operators further down the beef supply chain. However, some Te Mania Angus clients produce cattle for a different market and so progress in all indexes is monitored.

A novel approach to building client loyalty was the establishment of Team Te Mania in 1995. The Team is an integrated approach to the supply of genetic material to commercial breeders and unified marketing of the Te Mania bloodline through the beef supply chain. The Team also plays a major role in the genetic improvement program through assistance with the progeny testing of young bulls.

This paper discusses some design initiatives used by Te Mania Angus to maintain consistently high genetic progress and to remain at the forefront of the industry.

TEAM TE MANIA

Team Te Mania is a partnership of Australian beef cattle producers who work together to produce high quality beef cattle and collectively market through a nationally recognised brand. Continual improvement of the product through all facets of the production system is a focus of the team. Genetics is a major component in the production of high quality beef and is one of the facets where continuous improvement is pursued.

Team members have access to the latest genetics of Te Mania Angus through a bull leasing program and availability of discounted semen. One of the major advantages of team membership is that lease bulls are from the 'top of the pack', ie. members select their bulls prior to clients who purchase their bulls out-right (although only half a flush is made available to the Team to ensure bull sale clients are able to gain access to the elite genetics also). Sons of Team proven sires' now top Te Mania Angus sales which is proof that all of Te Mania Angus clients benefit from the Team programme.

One of the highlights of membership is the annual meeting which offers technical updating plus an exchange of ideas and the opportunity for direct feedback to the seedstock herd. Focusing on efficient management practices and cutting edge genetics, Team Te Mania allows members to target the more lucrative markets, especially the Japanese B3.

They work together to further advance the fertility and performance of their herds, achieving more cattle reaching commercial targets, in a shorter period of time from conception to turn off.

In turn, Te Mania Angus – the nucleus herd – benefits from vital production feedback used to further fine-tune the genetic program. It also helps to create client loyalty.

Team Te Mania offers a sophisticated marketing program for all classes of turn-off which includes feature female sales of surplus commercial breeding stock which are highly sought after. Team Te Mania is about starting producer members along the path from being price takers to price makers.

Established in 1995, this commercial alliance incorporates breeding stock throughout Victoria, New South Wales and South Australia. Currently there are some 36 herds mating 16,000 females.

The integration of Team Te Mania with the Te Mania seedstock operation over the past twelve years has assisted in the development and expansion of the seedstock breeding program and has helped to focus the breeding objective of the program.

TE MANIA ANGUS BREEDING PROGRAM

Te Mania produces 1200 registered Angus calves per year, with nearly 50% of these calves produced by embryo transfer from high genetic merit females and approximately 80% of the remaining registered females are joined to AI sires.

Breeding Program Design Initiatives

A recently released program TakeStock® (reported by Johnston and Moore 2005, as StockTake) analyses genetic progress made in seedstock herds and the variables that have contributed to this progress. These results show that the average index value for Te Mania Angus is in the top 5% of the breed (5% is the highest percentile bracket reported). It also recorded that the dams used for ET were a massive \$5.00 on index value above the breed average for ET dams. Sires were \$3.00 above breed average. TakeStock further reports nearly \$5.00 per year improvement in average B3 index over the last five year period (see Figure 1). This is again well above the average for the breed.

With such high average performance compared to the breed, one of the problems faced by Te Mania Angus is finding sires that are superior to the animals within their herd. The definition of selection differential used in TakeStock is the average genetic merit of sires used, compared to the average genetic merit of male calves born in the herd three years previous to the calf crop being evaluated. The logic for this definition is that those calves could have sired the calf crop under evaluation and therefore form a fair base to evaluate the bulls being used. It should also be obvious that the same sires used in the Te Mania Angus herd will have a lower selection differential than if they were used in a herd with a lower average genetic merit because the base for comparison would be lower.

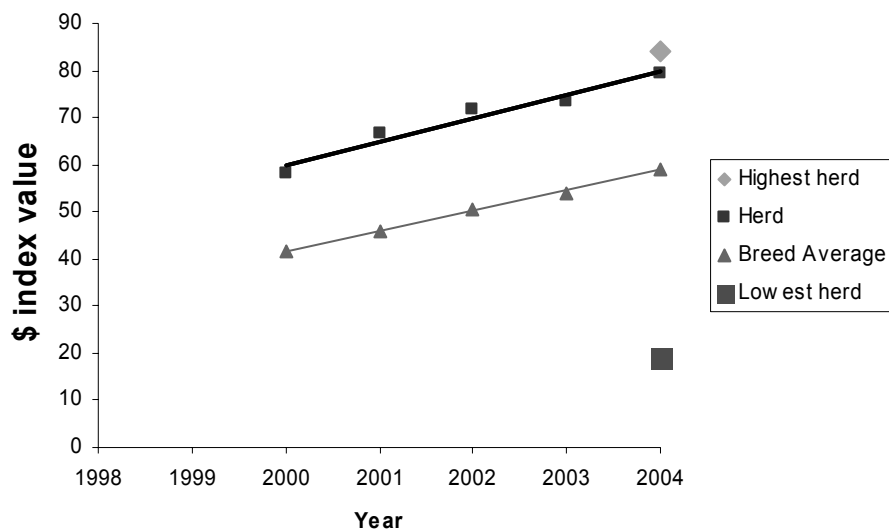


Figure 1. Genetic progress in average B3 index values over the 5 year period 2000 to 2004.

Te Mania Angus uses two approaches to finding sires that will maintain or increase genetic progress. Artificial insemination is used to introduce high genetic merit outside sires and the best of the home bred young bulls are used at an early age. The AI sires are generally high accuracy and can be used with confidence but the young homebred sires come with the risk associated with lower accuracies. Risk is managed by using a reasonable number of the young bulls. Key to the success of this

program is that the young bulls are simultaneously the subjects of a progeny test program that is conducted in six of the Team Te Mania herds.

Progeny Testing. Selected team herds are committed to the progeny testing program of young Te Mania Angus bulls. Approximately 12 bulls per year are test mated in six fully BREEDPLAN recorded herds. Sires are selected annually for testing based on their index values plus a visual inspection for structural soundness. Some attempt is made to use a wide representative of sire lines in the young bulls. Sires are repeat mated across years to ensure across year linkage and linkage across herds is by AI from some of the young bulls.

In the progeny test herds all male calves are castrated and the full complement of weights (including birth weights) are recorded along with scans taken on both sexes. Heifers are fully recorded for calving ease and days to calving. The majority of steers are followed through to slaughter and carcass records submitted for BREEDPLAN analysis.

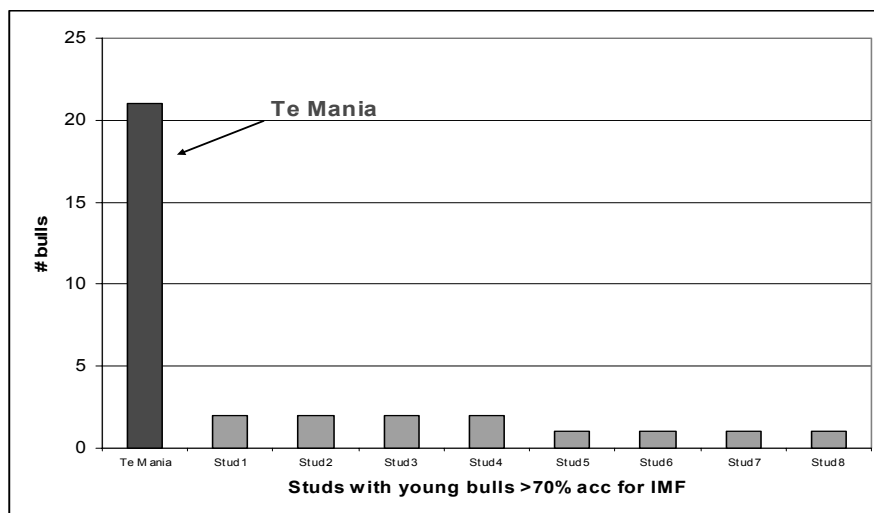


Figure 2. Number of 2003 drop bulls with greater than 70% accuracy for IMF EBV.

Proof of the value of the progeny testing can be seen in the examination of the number of young bulls from various stud herds with above 70% accuracy for IMF EBV as shown in figure 2. To set the cut-off at 70% is rather arbitrary, but it is a figure that is generally accepted by the industry and it usually will require the bull to have progeny to achieve this accuracy. The figure shows that the number of Te Mania Angus 2003 drop bulls at greater than 70% accuracy is 21, well above any other stud. Even if calculated as a percentage of male calves born the number is more than twice the next best herd.

Breeding Program Design Initiatives

However the length of time from first using the bulls at 15 months of age until a reasonably accurate proof is available is considerable. Take for example the 2003 drop bulls; they were first used in 2004 but the accuracy is not evident until 2007. This lag period has to be considered in planning genetic improvement and Te Mania Angus are still trying to decide how to best capitalize on this information. Semen storage is practiced for most of the progeny test bulls and is thought to be the best option long term to allow the better bulls to be used once the results of progeny test are included. Te Mania Angus is fortunate that for young bulls that are used in the Te Mania parent herd there is the option to promote the daughters of these proven sires to elite donor level. High merit young bulls that are used only in progeny test herds must be brought back into the parent herd.

Choosing the Right Objective. Te Mania Angus has been using BreedObject since it was first introduced to the beef industry. In the early days, workshops were conducted with key clients to determine the most appropriate index for their commercial needs. Results of these workshops were amalgamated into an index used by Te Mania for selection. When the standard B3 index was introduced it was found to be closely aligned with the Te Mania index and was adopted as the primary index for selection and marketing purposes.

In later years, closer contact with Team members and feedlots and processors has encouraged development of a customized index that is used for selection in conjunction with the Angus B3. Differences between the indexes are subtle and reflect slight changes encouraged by client information including downstream clients of commercial breeders such as feedlots and processors, plus the considered opinion of the Te Mania management as to future directions of the beef industry.

Until this year, this index was not used for marketing as the two indexes are closely related and the confusion created by publishing another index was not warranted. Now that a better understanding of the Jap B3 index exists in the wider industry, it was decided that the Te Mania Index would be provided in sale and semen catalogues.

Total Genetics Resource Management (TGRM). Te Mania Angus was one of the first to use the program known as TGRM (Meszaros, 2002) and have continued to use it in its commercial form, BreedExact from Elders. It is considered that this program value adds to the effort of data collection and EBV calculation by making the mate allocation more precise.

Scale of Operation. The Te Mania Angus herd has grown significantly over the last 10 years. The females now all run on a separate property “Woolongoon” near Mortlake.

The cows are run in a commercially real environment. This habitat gives the herd the limitations in which it must perform profitably. Cattle which can not perform profitably are culled. This habitat becomes a filter to ensure any adverse genetics can not slip through the scrutiny of genetic selection.

Cows run in large mobs of up to 600 keeping the contemporary groups together.

Not all Beer and Skittles. Te Mania Angus has taken the approach that if technology is available it should be evaluated for its role in the genetic improvement program. Not all initiatives undertaken have paid dividends. Net Feed Intake (NFI) is one such example. While it is acknowledged that feed intake is an important trait in the beef cattle industry, attempts to calculate NFI EBVs appear to have ‘run up some dry gullies’. Latest information is that the Insulin Like Growth factor 1 test is not as valuable as first thought and Te Mania Angus is re-evaluating its use of this test.

Gene Markers. At this point gene markers have not been used extensively in the selection program however hair or semen samples have been stored on all important animals in the pedigree and will be tested at a point when it is considered warranted. Te Mania's preference is that the information from DNA tests be incorporated into the EBV for the specific trait.

CONCLUSION

It is very important for progressive seedstock herds to be early adopters of technology, as it gives them the opportunity to maximize benefits from new technology in their breeding operation. The result is faster genetic improvement and more profit for their clients. But faster genetic progress will only eventuate if the technology is implemented in a well organized business.

However, being early adopters of technology comes with some risks as the technology has not been rigorously tested in practical breeding herd situations to iron out any unforeseeable "bugs".

While implementing scientifically sound breeding theory, seedstock herds must be mindful of the need to evaluate the theory under practical conditions. To do this seedstock cattle need to be kept in a management system that will instantly report if any theory has been applied to the system which in practice will not work. In part this is to check that the theorists have not missed an important genotype by environment interaction but also to demonstrate to commercial clients that the genetics will perform under conditions similar to their own production systems.

The genetic technologies that are being developed by our industry's scientists and others, can make a positive and profitable contribution to farmers, feedlotters, processors and to the economy of Australia but they must be effectively applied in seedstock herds.

REFERENCES

- Johnston, D. J. and Moore, K. L. (2005) *Proc. Assoc. Advmt. Anim. Breed. Genet. 16: 161.*
Meszaros, S.A. (1999) *Proc. The Application of Artificial Intelligence, Optimisation and Bayesian methods in Agriculture, QUT: 153.*