FACT SHEET

RAPID HERD RECOVERY

NORTHERN NSW

Rapid Herd Recovery

Combining genomic and reproductive technologies for beef resilience and productivity after drought

Returning to optimum herd productivity remains one of the key challenges after drought.

The generational turnover for the average beef herd is 6.5 years, and there is an overwhelming imperative to ensure replacement heifers (either bred or purchased) are selected and joined to obtain the highest level of productivity, while minimising risks associated with low conception rates and dystocia.

The decisions made around heifer joining are critical to short term recovery and long-term resilience of the beef enterprise.

A large proportion of Eastern Australia experienced extremes of climatic variation between 2018 and 2022, with a widespread severe drought to 2020 and above average rainfall in 2021 and 2022. Beef producers were forced to significantly reduce breeding cow numbers at low prices. When favourable conditions return, producers seek to increase breeder numbers, often at record high prices which delays restocking and therefore cash flow and business recovery.

The use of artificial breeding technologies, specifically fixed time artificial insemination (FTAI), has been successfully used to stimulate heifer conception rates at joining. Several Australian and USA studies have been able to demonstrate that despite additional costs associated with semen purchase and AI, profitability per head improves with increased heifer conception rates, reduced heifer and calf mortality, reduced bull costs and in some cases improved weaning weights, due to an earlier calving.

Sexed semen has been available for over a decade, and is starting to be used in beef seedstock breeding, particularly in vitro fertilisation (IVF) and embryo transfer (ET) programs. Whilst there is significant use in the dairy industry (up to 70%), use in commercial beef enterprises is relatively low.

PRODUCER INSIGHTS

- **Large variation in genomic predictions and therefore genetic potential exists within the herds**
- **The variation in conception rates is influenced by bull choice (semen), protocols used, and management of heifers pre and post AI**
- **AI'd heifers that produced female calves had virtually no dystocia issues**
- **At marking, calves born to AI appeared to be of high quality compared to calves from natural mating, however, this may reflect their earlier birth date**
- **Good management and facilities allow for the three technologies to be combined with relative ease**

THE PROJECT

This producer demonstration trial was initiated by the University of New England-hosted Armidale Node of the SQNNSW Innovation Hub, funded by the Australian Government's Future Drought Fund, to quantify the potential of combining technologies to accelerate breeding herd capacity through effective selection and joining of heifers.

The project is being conducted on four (4) properties in the Northern NSW region that have self-replacing Angus herds focused on building herd capacity.

On each property, the trial is comparing the performance of 100 genotyped heifers joined via FTAI to high merit bulls with female semen, with 100 heifers naturally mated on farm. At the end of the project, a formal benefit cost analysis of the three technologies will be undertaken, as well as an analysis of the barriers to implementation on farm.

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The SQNNSW Innovation Hub receives funding from the Australian Government's Future Drought Fund.

In commercial herds, there may be significant benefits in optimising the number of female calves, particularly for self-replacing breeding herds emerging from drought conditions, as well as benefits associated with lower birth weights in female calves.

For heifer selection and management, new genomic tools such as HeiferSelect (Angus Australia) are being used to predict the genetic merit of heifers prior to joining, allowing effective mating to the most appropriate bulls within and between breeds.

Combining the anticipated benefits from FTAI, genomic selection and sexed semen appear to offer significant benefits (both financial and management) to commercial self-replacing herds. However, current information does not clarify whether these benefits are additive and if accelerated breeding and selection technologies will have a real influence on recovery from drought and long-term beef business viability.

EARLY-STAGE RESULTS

All four properties completed HeiferSelect on at least 200 of their 2022 drop heifers. The genotyping results showed the variation in genetic potential within the herds (despite being high performing herds with a strong focus on bull selection) was still significant. All herds had heifers that ranged in genetic value from the bottom 20% of the population to the top 10% of the population; a difference of $278 in index value and for traits such as marbling a variation of up to 125 MSA units. The costs of each AI program varied due to the operator and semen that were used. The above table has indicative prices for each of the components of the program, and then the indicative cost of a female calf on the ground*. Assuming a 45% conception, the cost of a live female calf is $268.90.

COSTS	INDICATIVE PRICES
AI costs, including insemination & materials	$45.00
Semen	$60.00
Labour	$16.00
Average costs	**$121.00**
Conception	45%
Cost per live female calf*	**$268.90**
Natural Mate (bulls at $12,500 for 3 years, joining rate 33:1)	$154.32

This contrasts with the cost of a natural calf of $154.32.
In terms of calves born, AI success for sexed semen ranged from 31% to 49% per property, with sire differences ranging between 21% to 67% in conception. Some differences may be a result of the different AI protocols used across the four properties. All four properties recorded some male calves born despite the semen being sexed: ranging from 6% to 10%. All four properties had very low incidence of heifer dystocia and mortality. Notably all four properties are using sexed semen again in the 2024 breeding season. All four properties had several dry heifers after AI and backup (up to 20%); this is being investigated.

Calves are currently being marked and tissue sampled (TSUs) for sire verification and HeiferSelect genotyping. The calves will be weighed at weaning to determine phenotypic differences, and those results (including calving ease and heifer conception rates) will be compared to the HeiferSelect predictions.

MORE INFORMATION

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WHAT'S UP NEXT

Sexed semen combined with using genotyping of replacement heifers appears to be a very useful tool to help producers accelerate the performance potential and numbers of breeding females after drought.
In 2025, we'll present the project results at a series of field days, to compare the AI calves, and to gain further insights from each of the trial participants.