

final report

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Feed intake measurement of cattle in the Tullimba R&D Feedlot

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Executive summary

This report covers the 589 Angus steers from 5 Cohorts of Steers that had feed intake and weight gain recorded on them in UNE's Tullimba feedlot in the 2016/17 period. All data has been delivered to BreedPlan. This final report includes a summary of the final cohort (Cohort 5) and a summary of all cohorts.

Cohort 5: 92 Angus steers that began feed intake testing at Tullimba on 10/03/2017. They finished in the feedlot on 29/05/2017. To date cattle have generally performed well and have averaged around 15.1 kg/day feed intake for the 77 days. Trial average weight gain has been 1.995 kg/day weight gain (range 1.14 - 2.74 kg/day) during the 70 day test period after adaptation to the feeders. Retrieval of valid daily feed intake data will allow robust estimates of RFI and EBVs. Feed intake and live weight data from manual weighing is being reported to the breeder groups fortnightly and have been supplied to BreedPlan via Jim Cook.

All Cohorts: 589 Angus steers that began feed intake testing at Tullimba on 04/11/2016. The final cohort finished in the feedlot on 29/05/2017. Cattle have generally performed well and have averaged around 13.9 kg/day feed intake. Trial average weight gain has been 1.46 kg/day weight gain (range 0.49 - 2.79 kg/day) during the test period after adaptation to the feeders. Retrieval of valid daily feed intake data will allow robust estimates of RFI and EBVs. Feed intake and live weight data from manual weighing is being reported to the breeder groups fortnightly and have been supplied to BreedPlan via Jim Cook.

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1 Background

1.1 Background regarding NFI testing

Feed is the largest recurring input cost in beef cattle production systems. Residual feed intake (RFI, also called 'net feed intake' or NFI in Australia) is a measure of feed use efficiency and can be used to help manage the utilisation of feed on farm and in the feedlot. Net feed intake is calculated as the difference between the actual feed intake by an animal over a test period minus that expected or predicted based on its size and growth rate (Herd et al. 2003a). An animal with a lower feed intake than expected is considered more efficient. Selective breeding for low-RFI animals offers the potential to produce progeny that will eat less with no compromise in size or growth performance (Archer et al. 1999). There has been shown to be genetic variation for NFI with moderate Heritability in growing cattle being reported (Arthur and Herd 2012). However, the opportunity to improve profitability in the feedlot through animal breeding for lower RFI is dependent not only on the existence of genetic variation in RFI, but also on the magnitude of genetic associations with other key production traits. For feedlot cattle, these traits include growth rate, feed conversion ratio (FCR), and carcass and meat quality traits, many with tight market specifications and penalties for non-compliance. Genetic merit of cattle for breeding purposes is described by estimated breeding values (EBV; BREEDPLAN 2010), with trial RFI-EBV first becoming available in Australia in 2002 in the Angus breed (Angus Society of Australia 2002), and BREEDPLAN RFI-EBV becoming available at the end of 2013 for Angus cattle (Herd et al. 2014).

To Gain the information regarding NFI standards for the collection of good data have been described. In general the amount of time required to collect stable data is the biggest influence on NFI testing. The length of a RFI test and the amount of data collected needs to be optimized to reduce the cost of testing animals. The current recommendation to the Australian industry for a 70-d RFI test is based on the results reported by Archer et al. (1997). They showed that for British breed cattle tested for RFI, with feed intake recorded daily and animal BW measured weekly, that while 35 d was adequate to measure feed intake, 70 d was required to accurately measure growth and RFI. Archer and Bergh (2000) analyzed data from centralized tests in South Africa for young bulls from five breeds and four biological types to conclude that while a test of between 42 and 56 d was sufficient for measurement of growth rate, feed intake required 56 to 70 d to measure accurately, and RFI required around 70 to 84 d. Some work has been undertaken by UNE to examine the test length utilising the data that has been collected in this and previous trials.

2 Project objectives

1. To measure and report on the feed intake of Angus Beef Information Nucleus (BIN) Livestock at UNE Tullimba Feedlot Research Facility including provision of Reports containing data
2. To collect and store the data from this Project as well as other data generated by GrowSafe and other recording equipment. This data will be stored in a database accessible by UNE researchers subject to Clause 8.9 of the Agreement.

3 Methodology

Number and sex of cattle fed:

Cohort 1	88 Angus steers
Cohort 2	156 Angus steers
Cohort 3	180 Angus steers
Cohort 4	105 Angus steers
Cohort 5	100 Angus steers

Date of exit to from the feedlot:

Cohort 1	17/01/2017
Cohort 2	30/01/2017
Cohort 3	13/02/2017
Cohort 4	09/03/2017
Cohort 5	23/04/2017

Payment is based on \$2/head/day for trial periods (7+70 days) in feeders.

4 Results

Cohort 5: Feedlot pens 4,15

Head count = 92

Number of full feed days = 77

Trial First full feed date = 10/03/2017

Trial Last full feed date = 29/05/2017

Trial Start Wt Date = 10/03/2017

Trial End Wt Date = 29/05/2017

Number of Trial days = 77

Valid Feed Intake days: 72 Pen 4
71 Pen 15

Note. The number of valid Feed Intake days is less than the days of the trial due to power outages (storms), rain days and equipment issues.

Table 1 Summary of Animal Performance over the Test Period

	TRIAL START WT (FITTED) (KG)	TRIAL END WT (FITTED) (KG)	WT GAIN (KG)	ADG (KG)	AVG DAILY FI (G)
MIN	399	539	91	1.14	6118
MEAN	496	655	159	1.995	15156.5
MAX	597	797	219	2.74	19874

The table below summarises the completed milestone.

Breed	Number	\$	Start feeders	End test	Days on feeders
Angus	92	\$14,168	10/03/2017	29/05/2017	77
Total number of animals	95	Final \$ amount	\$14,168		

Final Summary – All Cohorts

589 Angus steers that began feed intake testing at Tullimba on 04/11/2016. The final cohort finished in the feedlot on 29/05/2017. Cattle have generally performed well and have averaged around 13.9 kg/day feed intake. Trial average weight gain has been 1.46 kg/day weight gain (range 0.49 - 2.79 kg/day) during the test period after adaptation to the feeders.

Table 2 Summary of Animal Performance over all cohorts over the Test Period

	TRIAL START WT (FITTED) (KG)	TRIAL END WT (FITTED) (KG)	WT GAIN (KG)	ADG (KG)	AVG DAILY FI (G)
MIN	395	475	36	0.49	6118
MEAN	511.7	619.8	108.3	1.5	13954.3
MAX	637	797	219	2.79	19874

Breed	Number	\$	Start feeders	End test	Days on feeders
Angus	87	\$12,354	04/11/2016	13/01/2017	71
Angus	153	\$21,726	21/11/2016	30/01/2017	71
Angus	75	\$11,100	01/12/2016	13/02/2017	75
Angus	95	\$14,060	06/12/2016	17/02/2017	74
Angus	87	\$13,224	25/01/2017	10/04/2017	76
Angus	92	\$14,168	10/03/2017	29/05/2017	77
Total number of animals	589			Final \$ amount	\$86,632

5 Discussion

The project proceeded as planned though anticipated completion dates were later due to delays in feeder availability and Angus Society supply of cattle. Please note that there has been a slight discrepancy between planned numbers of animals and the final numbers due to management factors prior to entry at the feedlot (i.e. sickness, injury and environmental factors (drought)).

6 Key messages

The Growsafe facility at Tullimba is a valuable industry resource for RFI testing. The data collected from the project is underpinning the NFI EBV that can be utilised by breeders to select for feed efficiency.

To be maintained, the facility needs a regular flow of cattle through it to help fund any repairs and maintenance and for future upgrading of the facility.

7 Conclusions/recommendations

It is key that the beef cattle industry makes as much use of the raw data collected and stored for genetics R&D as possible.

The main limitation of the project thus far is the lack of investment in human capacity to analyse some of the novel data that has been recorded as part of this project. Small investment in personnel time would increase the value of this data to industry.

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