POTENTIAL VALUE OF IMPROVED FEED CONVERSION EFFICIENCY IN DAIRY HEIFER CALVES IN AUSTRALIA

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Feed costs make up a large proportion of the total farming expenses associated with dairy production. Selecting animals that are more efficient at converting feed into milk has the potential to reduce feed requirements in a herd, and help maintain a profitable operation. A measure which represents the inherent variation in basic metabolic processes which determines efficiency of feed use, is residual feed intake (RFI). Residual feed intake in young, growing heifer calves is defined as the difference between actual dry matter intake, and predicted requirements for growth and maintenance of live weight. Calves with a negative RFI value are considered to be more efficient than average, and calves with a positive RFI value are considered to be less efficient than average.

To determine the phenotypic variation of RFI in Australian dairy heifer calves, 903 Holstein Friesian heifer calves, 5 – 7 months old, were measured for RFI in three groups of approximately 300 animals. Calves were housed under feedlot conditions for up to 90 days and had *ad libitum* access to cubed lucerne hay. Intakes of individual animals were recorded via an electronic feed recording system, and live weight gain was determined by weighing the calves once or twice weekly.

During the trial, calves averaged intakes of 8.9 kg DM/day, with live weight gains of 1.1 kg/day. The most efficient 10% of calves had an RFI of - 0.74 kg and the least efficient 10% of calves had an RFI of 0.75 kg. Therefore for the same weight gain, feed efficient calves consumed 0.8 kg DM less each day than the average intake of the whole group of calves, and the less feed efficient calves consumed 0.8 kg more than the average intake for the whole group. In the most extreme animals, a phenotypic difference in intake of at least 3 kg DM/day was observed between the most efficient and least efficient calves in each group. This equates to about 35-40% difference in feed intake.

To determine the potential costs/savings of more efficient or less efficient calves, an economic analysis was conducted using a range of feed costs ($250, $300 and $350/t). If it was assumed that feed is worth $250/t, a more efficient calf with an RFI of - 0.74 would save $73/year due to reduced feed intake. For a farm that typically rears 50 calves per year the reduction in feed costs could potentially be $3,650/year, if they only reared efficient calves with a negative RFI. If the assumed value for feed increased to $300/t, the saving for this farm could potentially be increased to $4,380/year. Increases in the value of feed, and a larger number of calves reared each year will have a greater potential for reducing feed costs when selecting genetics for improved feed conversion efficiency.

The variation in RFI observed amongst the calves measured suggests there is a large amount of heterogeneity amongst dairy heifer calves in Australia, this may enable the trait to be considered as a selection index for genetic selection of future herds. The potential to reduce feed costs by improving feed conversion efficiency through genetic selection may be economically important for dairy herds in Australia, particularly if the differences observed in calves are also present in mature, lactating cows.

Keywords: feed conversion efficiency, residual feed intake, dairy heifer calves, economics