



# Selection for Feed Efficiency in Beef Cattle



# Efficiency

- Aim of beef cattle breeding is to improve profitability
- this a function of outputs and inputs
- need to consider inputs if we are to improve efficiency of production and increase profit
- feed is a major cost

## Production system feed efficiency

- Aim is to increase output of beef per unit of feed used over the whole production system
- can do this in beef system by:
  - choice of breed
  - crossbreeding
  - selection within a breed (particularly for cow breeds)

# Feed Costs in the Beef Cow Herd

- 70% feed energy required for beef production is used by the beef cow herd
- 70% of the feed energy required by the cow herd can be attributed to feed energy costs for cow maintenance
- therefore 50% of total feed energy required to produce beef to slaughter age is needed for feed maintenance costs in the cow herd

## Measures of Feed Efficiency

- Gross feed efficiency (or its inverse feed conversion ratio)
- cow - calf efficiency
- net or residual feed intake

## For the Beef Cow Herd

- Beef Breeding Herd =  $\frac{\text{Weight of calf weaned}}{\text{cow weaning weight}}$

where weight of calf weaned is influenced by

- number of calves weaned
- weaning weight of the calves cow weaning weight
- average cow weight during the year
- reflects the feed costs of keeping the cows

## Effect of cow liveweight on total yearly feed intake when weaning a constant 50% of maternal LW

Cow Weaning	400	450	500	550	600
Cow Mid Winter	380	420	470	510	560
Cow Mating	390	430	480	520	570
Calf W.W	200	225	250	275	300
Calf LWG	0.94	1.06	1.18	1.30	1.43
Calf Birth wt	30	33	36	39	42
Feed Consumption Kg DM	2693	2996	3301	3596	3911

## Net Feed Conversion Efficiency

- Net FCE refers to the variation in feed consumption between animals beyond that related to differences in growth rate and body weight
- Net FCE is measured as the difference between an animal's expected feed intake during a given period and its feed intake
- High Net FCE animals will eat less than expected whilst low Net FCE animals will eat more than expected

## Estimated Breeding Values (EBV) for selected Angus Sires

- High Net Feed intake EBV                      -1.13 67 % Acc
- Low Net Feed Intake EBV                      0.90 87% Acc
  
- Difference  $2.03/2 = 1.01$
- in 8 kg intake = 13 % difference
- units Kg/feed per day (10 MJ ME/kg DM)

# Proposed Trial

- Breed calves using industry Angus cows and semen from 6 lines
  - high and low 600 day weight EBV
  - high and low maternal (milk EBV)
  - high and low NFE EBV ex Australia
  - purchase 150 steers and heifers and move to Massey
  - estimate NFE by measuring intakes at pasture and comparing with estimated intakes using prod and liveweight

# Continued

- Take steers to through to slaughter (meat attributes)
- heifers through one calving at 2 years of age
- Compare efficiency of 6 lines
- Do we need to include NFE as a selection criteria
- Or does it not matter under grassland conditions and perhaps we select for income and account for feed intake estimated from production