# Maternal Efficiency in Variable Nutritional Environments

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Industry is concerned about the impact on breeding herd efficiency of adopting selection strategies influencing body composition, such as selection for improved feed efficiency or increased carcase yield, especially in variable nutritional environments. The beef industry requires resilient cows that can efficiently utilise variable feed resources. They will need to efficiently store and mobilise body tissue as required, whilst also having the potential to maintain high fertility and produce progeny that meet high quality market targets.

The industry currently lacks the knowledge to effectively balance these potentially conflicting requirements. The Beef CRC Maternal Efficiency Program is designed to bridge this knowledge gap and involves an industry herd component and a research station component being run simultaneously.

The industry herd component involves recording performance on approximately 8000 BREEDPLAN recorded females (6000 Angus, 2000 Hereford) from conception to weaning of their second calf. The females have liveweight, hip height and body condition score measures as well as ultrasound scans for eye muscle area (EMA) and fatness (Rib, P8 and intramuscular fat: IMF) recorded at pre-calving and at weaning during the first and second parities. This will indicate the amount of body tissue accumulated or mobilised depending on feed supply (pasture through the year) and energy demand (pregnancy and lactation). Data has been collected for 4 years and is now 75% complete. Table 1contains first and second parity results.

**Table 1. Adjusted means for traits recorded on heifers during 1st and 2nd parities**

| | Weight (kg) | Condition Score | Hip Height (cm) | IMF % | P8 Fat (mm) | Rib Fat (mm) | EMA (sq cm) |
|---|---|---|---|---|---|---|---|
| *1st parity* | | | | | | | |
| Pre-calving | 480[a] | 3.2[a] | 131[a] | 4.4[a] | 6.6[a] | 4.7[a] | 53[a] |
| Weaning | 510[b] | 3.3[a] | 130[b] | 4.8[b] | 6.8[b] | 5.2[b] | 56[b] |
| *2nd parity* | | | | | | | |
| Pre-calving | 551[a] | 3.6[a] | - | 5.6[a] | 8.3[a] | 6.0[a] | 60[a] |
| Weaning | 596[b] | 4.0[b] | - | 6.4[b] | 11.0[b] | 8.2[b] | 66[b] |

[a,b] Means differ (P<0.05)

The research station component is being conducted at the Vasse and Struan centres in W.A. and S.A. respectively. At both sites heifers that are genetically divergent in residual (or net) feed intake (RFI; a measure of feed efficiency), or in rib fat thickness, are run under either high or low nutritional regimes. Feed intake, and more detailed measurements on calf production and reproductive performance are being recorded. Data collection at Vasse has been underway for 3½ years and at Struan for 2½ years. The data for heifer conception rate (CR) is now complete. There was a significant difference (P>0.05) between the fat lines: the high fat line had a 94% CR whereas the low fat line had an 85% CR; there was no difference between the high and low RFI lines. The heifer CRs were evaluated before nutrition treatments had begun so it will be important to follow these animals to see if these results are repeated during their lives or if nutrition has other influences.

The Maternal Efficiency Program will progressively deliver results that will inform beef producers on the impacts estimated breeding values for carcase fatness/carcase muscularity and for feedlot feed efficiency have on maternal efficiency under variable nutritional environments. Results are published in the Maternal Journal available through the Beef CRC website (www.beefcrc.com.au).

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