The Beef Quality CRC* is studying links between the genetics of beef quality and female reproductive fitness in northern Australia. For instance, does selection for meat quality, carcase yield or feed efficiency affect fertility and adaptation to harsh environments? Results from this trial will also further strengthen BREEDPLAN for Tropical breeds. Key indicators will be feed efficiency, female fertility, beef quality, carcase yield and adaptation to tropical environments.

The project is jointly funded by CRC, MLA and the Australian Centre for International Agricultural Research (ACIAR) with an important South African linkage. Key sponsors breeding calves for the project are the Northern Pastoral Group (NPG) of Companies; Stanbroke, NAPCO, Consolidated Pastoral Co, AA Co, E & G Maynard, J McCamley, C. Briggs, Kidman Holdings and QDPI. The breeding program commenced in 2000, and 4,800 calves have been generated over four years. Some 3,000 each Brahman and Red Composite cows, have been joined to Sires high and low in Yield% and IMF% EBVs and with known gene marker profiles. There are also sires nominated by the industry partners. Steers are grown out at “Tullimba” (Armidale), “Kiargathur Station” (Condobolin), Brigalow Research Station (Theodore) or “Berrigurra” (Blackwater QLD). At around 420 kg they go on feed for 110 days in the “Tullimba” research feedlot, until they reach 320-340 kg carcase weight, then processed at Grantham abattoir. All steers are implanted with Elanco HGP’s to reflect industry practice.

Progress has been amazing, considering the drought: The fourth, and last, calving was completed this summer 02/03. ("Belmont", "Alexandria Station" and "Beresford"); The '00 and '01 heifers have recently been joined at the various research stations ("Belmont", "Brian Pastures", "Toorak" and "Swans Lagoon"); The '01 Steers have mostly been grown out, finished at "Tullimba" research feedlot (with feed efficiency measured) and slaughtered. The '02 steers and heifers are at various grow-out locations, heifers to be mated Nov/Dec ‘03. Projects such as this need all the data in and careful analysis before releasing full results. Some generalised early heifer pregnancy data, below, may however be of interest re female condition and fertility and also an indicator of the type of results to come.

Preliminary results of scanned fat thickness at start of joining and subsequent pregnancy rate show a significant relationship between rump (but not rib) fat depth and pregnancy for all classes of breeding females (lactating and non-lactating; different age groups corrected for weight). Every 1 mm increase in rump fat represented a 1.2% increase in pregnancy rate over a base of 65%. See Figure 1 above.

Once heifers reach 200kg, scanning is also used to monitor ovarian function and study factors affecting puberty. They are scanned every 4-8 weeks until a corpus luteum (CL) is detected and they are deemed to have reached puberty. Scanning continues during joining to determine: i) when heifers that were anoestrous into mating commence oestrous activity; ii) early pregnancies and possibly extent of embryonic losses and iii) time of return to oestrous of lactating females.

The different genotypes of heifers are allocated equally across different research station grow-out environments. These range from hot dry climates with no ticks and low worm burdens to dry tropical environments with hot, humid summers, unimproved to partly improved spear-grass country with varying levels of tick, worm and buffalo fly burdens. Early results in heifers up to 2 years of age show strong breed and environmental effects on age and weight at puberty. Average weights of different groups as 2 year old at start of joining, ranged from 250kg to 375kg, rump fat from 2mm to 5mm and puberty from 13% to 94% (as measured by CL scans).

Heather Burrow (CSIRO Rockhampton) and Brian Sundstrom.
Another major project for CRC II, is a study of 'best bet' regional combinations of genotype and nutrition. There are four sites across southern Australia, Struan, South Australia, Wagenup in WA, Hamilton Victoria and Griffith, NSW. They are each testing nutritional options relevant to their region, allowing lines of steers of different genetic potential (for carcase type) to be grown at different rates, and finished for various markets. The NSW site is "Bringagee" station (Ag Reserves Australia), near Griffith. It is supervised by NSW Agriculture researchers John Wilkins, John Irwin and Bill McKiernan.

Table 1 shows some raw averages for the breed groups from "Bringagee". This has not had final adjustments and is provided here to show some trends and the ranges, eg The feedlot weights are from a group with a six week calving spread.

John Wilkins - NSW Agriculture, Wagga and BS

Groups of 500-700 Hereford cows are involved at each of 5 matings for Spring and Autumn calving groups. These are being joined by AI to five carcase types, each represented by eight sires (40 total):
- Angus High Yield % EBVs (Ay)
- Angus High IMF % EBVs (Am)
- Angus High Yield % and IMF % EBVs (Aym)
- Wagyu Black (Wb) and Wagyu Red (Wr)
- Charolais (C) and Limousin (L)

After weaning, the steer progeny either follow High or Low growth paths to reach (average) 400kg feedlot entry weight at either 13 or 19 months of age. This split calving allows the Low growth group from one calving to join the High group from the following calving to come together for finishing and slaughter (at Cargill’s "Jindalee" feedlot near Temora and their Wagga works). This is essential for valid comparison of performance and carcase quality between groups.

In spring 2002, they completed the last of 5 matings and the fourth calving. The first feedlot group has just been slaughtered (March) and the second group put on feed. There is a similar experiment at Hamilton in Western Victoria. This year, one of the grass finished slaughter groups from Hamilton was processed at the same time and works, further strengthening links across project sites.

Table 1 - Raw averages at Birth (4 calvings), Weaning (3), and feedlot entry (1).

<table>
<thead>
<tr>
<th>Sire breed over Hereford</th>
<th>Ay</th>
<th>Am</th>
<th>Aym</th>
<th>C</th>
<th>L</th>
<th>Wb</th>
<th>Wr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestation Length (days)</td>
<td>283</td>
<td>282</td>
<td>282</td>
<td>286</td>
<td>287</td>
<td>285</td>
<td>285</td>
</tr>
<tr>
<td>BWT (Kg)</td>
<td>36</td>
<td>36</td>
<td>35</td>
<td>39</td>
<td>39</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Muscle Sc (1-15)</td>
<td>7.5</td>
<td>7.0</td>
<td>7.5</td>
<td>10.5</td>
<td>9.5</td>
<td>6.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Rump fat (mm)</td>
<td>2.5</td>
<td>3.0</td>
<td>2.5</td>
<td>2.0</td>
<td>2.0</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Feedlot Entry Av Wt (kg)</td>
<td>390</td>
<td>414</td>
<td>399</td>
<td>423</td>
<td>408</td>
<td>383</td>
<td>381</td>
</tr>
<tr>
<td>Feedlot Entry Range (kg)</td>
<td>303-472</td>
<td>340-462</td>
<td>293-507</td>
<td>340-495</td>
<td>352-461</td>
<td>302-454</td>
<td>299-438</td>
</tr>
</tbody>
</table>

http://breedplan.une.edu.au