Overview of the Beef Quality CRC projects in WA

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This paper will report on:

1. The Regional Combinations project and
2. The HGP effect on Eating Quality.

The objectives are:

Regional Combinations

(i) To validate combinations of genetics and growth pathways and "best practice" management strategies against current industry practice in different regions.

(ii) To increase the proportion of cattle achieving market specifications.

(iii) To increase the adoption of technology and "best practice" strategies to regional groups.

(iv) To test the hypothesis that synchronising calving with the pasture-growing season is more sustainable system, both environmentally and economically.

The effect of HGP's on eating quality

(i) To test the influence of HGP's on eating quality of beef

(ii) HGP treatment increased ossification scores in steers but had no effect in heifers

(iii) HGP treatment reduced marbling scores and no effect on muscle pH

(iv) HGP treatment significantly reduced the eating quality of the Striploin and Rump muscles with 5 day ageing

Introduction

Many genetic and nutritional principles of beef production were developed in the first six years of research conducted by the CRC for beef and meat quality (CRC I). This technology will be translated into local practice by combining best regional knowledge of the environment (nutrition and climate), best management practices and cattle genetics on growth and efficiency, yield and meat quality attributes (tenderness and marbling). This will be done on four sites across Australia:

1. Western Australia – Alcoa Farmlands at Wagerup and Pinjarra and Vasse Research Station
2. Victoria – Pastoral & Veterinary Institute, Hamilton
3. New South Wales – 'Kooba Station', Narrandera near Griffith
4. Queensland – 'Scartwater', Charters Towers, Nth Queensland

The three projects across southern Australia are more closely linked (climate, breed type, pastures) than the Queensland project.

These sites will improve the relevance of research to the small to medium scale producers, as well as the pastoral companies. Sites will not only validate and demonstrate combination of pathways and genetics but will be the focal points for the regional 'leakage' of CRC results and workshops on supply of store cattle, feeder steers and steers for the live export trade.

Different pathways for the progeny will apply for the different sites because of different market requirements, but a number of linking principles will be common across sites:

- Use of "regional systems approach" to promote ownership of outputs and adoption of new technology by beef producers, by focusing on relevant issues at the local level.
- Where possible, work with established groups to promote collaboration from "conception to consumption".
- With local groups, use local scientists and extension officer knowledge to identify the "regional system'.
- Use Group BREEDPLAN performance tested sires.
- Use of CRC I and southern crossbreeding project sires to validate multi-breed EBVs from CRC I. This should link CRC I and CRC II as well as linking sites in Queensland, NSW, Victoria and Western Australia.

Fig 1. Regional combination sites in Australia

Aims

To use combinations of cattle genetics and growth paths to achieve market specifications across regional Australia.

Objective

To validate combinations of genetics and growth paths that will increase the proportion of cattle achieving specifications across Australia.

Specifically to examine the effects of different growth paths and feeding regimes on meat quality of slaughter cattle of diverse genetic meat attributes (retail beef yield - RBY%) and marbling (intra-muscular -IMF%). Also, to provide guidelines to producers to achieve higher compliance with market specifications, meat quality and profitability by using combinations of genetics and appropriate growth paths for steer and heifer production in southern Australia.

Southern Australian

Hamilton (Vic) and Struan (SA)

(i) To validate and compare combinations of genetic and growthpath pathways that will increase the proportion of cattle achieving market specifications in Southern Australia.

(ii) To examine effect of calving time (autumn vs. spring) on carcase specifications in finished animals.

(iii) To use new strategies as they are developed for filling feed gaps in the production system from calving to slaughter.

(iv) To integrate the outputs from other CRC II strategic science projects into systems for meeting specifications and improving eating quality.

(v) To validate the use of both multi-breed EBVs and growth paths in a model to predict carcase specifications.

(vi) To extend to the farming community the results of this project and previous CRC research. As a synchronised mating is being used in this project and also in NSW and WA (approximately 2300 females/year) this Regional Combinations project has the potential to examine synchronisation options with the objective of improving conception rates in beef cattle AI programs.

Treatments

(i) Two times of calving – autumn and spring.

(ii) Two growth paths for progeny after weaning – fast or slow

(iii) Sires with high EBV for yield, marbling or both (Angus, Wagyu, Limousin and Belgium Blue)

(iv) Export or high quality domestic market (Restaurant) - Feedlot entry weight 400 kg

New South Wales

(i) Measure the effects of altering growth paths in steer progeny varying in genetic potential for carcase traits.

(ii) Determine best combinations of genetics and growth treatments to maximise compliance to feeder and carcase targets.

(iii) Results of the above to be combined with other sites to generate multi regional recommendations.

(iv) Promote the extension of recommendations as they emerge, through media and group activities in collaboration with other advisory and CRC project activities.

(v) Provide genetic links between sites and other projects by the use of common sires.

(vi) Collaborate with other CRC projects for opportunistic use of experimental resources and incorporation of other results to systems within this project.

Treatments

(i) Two times of calving – autumn and spring.

(ii) Two growth paths for progeny after weaning - fast or slow (0.9 and 0.6 – 0.7 kg/hd.d)

(iii) Sires with high EBVs for yield, marbling or both (Angus, Wagyu, Euro)

(iv) Export or high quality domestic market (Restaurant) - Feedlot entry weight 400 kg

Western Australia

Two time of calving x two sire genotypes x three post - weaning nutrition options replicated over three years.

Evaluate the effects of:

(i) Two times of calving (Autumn vs. Winter), with a common weaning date (late Dec/early Jan).

(ii) Progeny with different ages (~ 6 vs. 9 months) and different weaning weights (~ 250 vs. 300 kg).

(iii) Two early maturing sire genotypes (high yield or high marbling traits).

(iv) Post-weaning nutrition options on the cost of producing 500 kg LW yearlings for the domestic trade which meet at least MSA ESQ3 specifications and the eating quality of meat from these production systems:

Post-weaning Nutrition

The progeny from both the winter and autumn calving period will be weaned in early January, upon which time they will go to Vasse Research Station to go into the growth path trials. There will be three different growth paths as follows:

(i) Sustained/fast growth from weaning to slaughter

(ii) Slow growth from weaning to entering feedlot

(iii) Compensatory growth. A loss of 10% of body weight post weaning followed by realimentation (recovery feeding).

A total of 150 progeny per time of calving will result in 25 animals per sire in each of the post weaning growth paths (Figure 2). Slaughter will occur when animals have reached approximately 500kg live weight. Animals in treatments (ii) and (iii) will be slaughtered on the same day as it has been shown that day of slaughter has a large effect on the quality of the meat.

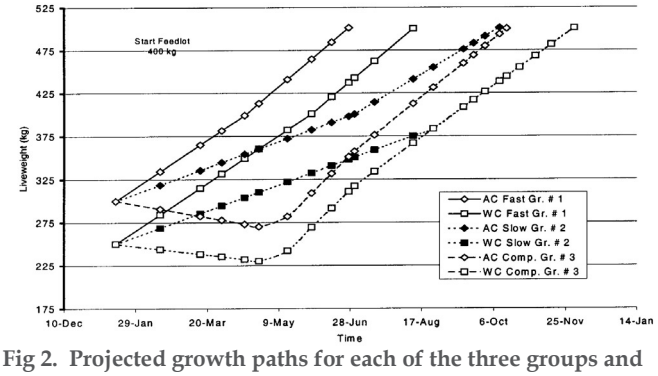

Fig 2. Projected growth paths for each of the three groups and two times of calving in the south west of WA

The growth paths for the progeny in the WA project are very different to the other two southern states. The weight maintenance or weight loss treatments were included in the WA project as these growth paths may occur in the Mediterranean environment. CRC I experiments investigated the effect of post-weaning progeny growth prior to entering feedlots on meat quality attributes of the carcase with only several experiments specifically looking at the effect of weight maintenance or loss.

Results in WA

The experiment started with > 600 Angus, Murray Grey or the cross cows at the Wagerup and Pinjarra properties, but has been reduced to 312 autumn 2002 calver's and 250 winter 2002 calvers. These numbers are down from the starting numbers due to culling after pregnancy testing.

Autumn Calvers

The majority of calving occurred during March and into April, however, there was some that calved in mid February and in May. Prior to calving extra cows were added to the mob as replacements for non-pregnant cows that had been culled after pregnancy testing. This will maintain numbers as close to original for the AI program.

Birth dates were recorded for all calves but no liveweights at birth. Only calves at Pinjarra were tagged at birth, which will means about 130 calves that will need to be DNA tested for parentage.

Wagerup

- Of the 188 cows that were artificially inseminated, 174 calved
- 7 died, including 2 sets of twins. Other causes of death were deformities and scours.
- 14 calved after the cut-off date.
- 3 cows in the Angus mob did not calve.

Pinjarra

- 83 cows were artificially inseminated, 78 calved
- 6 died including 1 set of twins. Other reasons for death are as above
- 1 calved after the cut-off date.

The first calf live weights were recorded at the end of May, with Wagerup having an average of 95.6kg and Pinjarra 94.8kg.

The AI program for the 2003 autumn calvers was an improvement on last years with an average of 87% of cows submitting to AI compared with 81% in 2001. One of the main reasons for this appears to be the condition of the cows. Last year the majority of cows were under condition score 2, whereas, this year conditions scores ranged from 2 to 3. There was also a 94kg increase in weight for the same time last year (end of May). To help achieve this result extra hay was fed and supplements of selenium and B12 were also administered prior to the program.

Winter Calvers

This group has gained approximately 14kg and 4mm of fat since January, resulting in an improvement in condition since entering the program. They have just begun calving and as at July 1st a total of 116 calves out of 245 cows had dropped. There has only been one death due to the calf being quite large (~50kg).

Pastures

Pasture Feed on Offer (FOO) and Quality measurements have been taken for both sites with data from Wagerup illustrated in Figure 3. Pasture FOO peaked in October and November at approximately 2400kgDM/ha. This amount dropped slightly into December with the majority made up of dry feed. FOO then declined further so in April 2002 at Wagerup FOO was below the

500kg DM/ha (DM) benchmark. FOO was only slighter higher at Pinjarra at the same time. Pasture exceeded the benchmark of 1000-1200 kg DM/ha required for cattle to grow at 0.5 kg/day from July 2001 to November 2001. (PROGRAZE WA 2001 Manual).

From December, metabolisable energy of dry feed declined to 7.0-8.0 MJ/kg, barely sufficient for maintenance, irrespective of quantity available (Figure 4). Supplementary feeding of autumn calvers started in March 2002.

Sustainability monitoring sites have been established in all paddocks and soil has been tested at these sites. Water runoff has been monitored and samples collected for nutrient runoff assessment. The first runoff of water from the paddocks was in the last week of July.

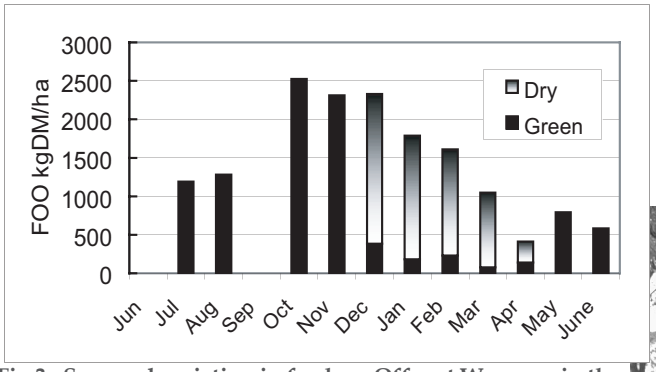

Fig 3. Seasonal variation in feed-on-Offer at Wagerup in the regional Combinations project

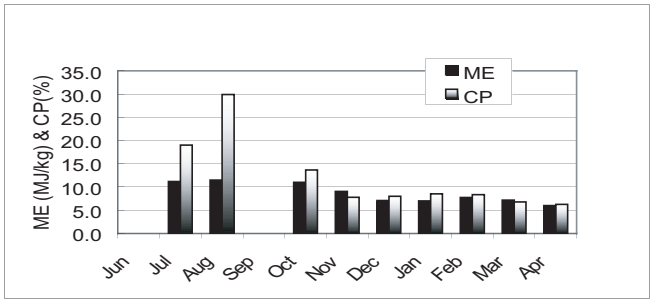

Fig 4. The metabolisable energy and crude protein content of pastures at Wagerup in the Regional Combinations project

Summary

The Regional Combination project is a 5-year project so it is still early days as the first calves were only born in 2002. They start on the progeny growth paths in 2003 and should all be slaughtered by the end of 2003. This will be repeated 3-times.