CRC FOR BEEF GENETIC TECHNOLOGIES

FACT SHEET

Effect of Supplementation and Age of Slaughter on Marbling




FAST FACTS

- **Marbling is considered "late maturing", meaning that higher levels of marbling are usually seen later in life, as the animal matures.**
- **Use of a high energy supplement during the immediate post-weaning period does not enhance chiller assessed marbling after feedlotting.**
- **Providing feeder cattle with high quality improved pastures post-weaning and during backgrounding will maximise marbling potential.**
- **Use Intramuscular Fat% EBVs to select cattle with a high genetic capacity to marble if targeting export markets that pay a premium for marbled beef, for example Japan and Korea.**

To maintain market share in valuable export markets that demand a premium quality beef product, consistency to produce that product is crucial for Australian beef producers. The value of post-weaning nutritional treatments before feedlot entry to maximise marbling was investigated by the Beef CRC in beef cattle with a high and low genetic capacity to marble.

What is Marbling?

- Marbling is the intramuscular fat (IMF), or adipose tissue, deposited in connective tissue seams that surround bundles of muscle fibres in beef, and is visible to the human eye as 'flecks' or spots of fat.
- Marbling is scored **visually** whereas IMF percentage is the fat content of the muscle measured **chemically** or by **ultrasound scanning**.
- Large consumer studies with cooked beef confirm that marbling improves eating quality. IMF directly affects juiciness and flavour and indirectly affects tenderness.

Previous research has shown the best way of increasing marbling is to finish cattle with a genetic propensity to marble on a highly digestible, grain-based diet. This provides the highest level of net energy and promotes fat deposition.

Investigating strategic post weaning nutrition

165 six month-old steers representing either high or low marbling genotypes were used to determine whether high energy supplement during the immediate post-weaning period enhances marbling. The steers were selected using IMF Estimated Breeding Values (EBVs) provided from sire line or individual animal information.

Nutrition

In this study, steers were yard weaned and fed lucerne hay for a week on arrival at Glen Innes Research Station in NSW. Steers were then divided into two nutritional treatments for 168 days. The treatments were:

1. Pasture only – initial grazing on improved New England perennial pasture (nitrogen fertilised Cocksfoot, Tall Fescue and Phalaris) rotated with ryegrass and grazing oats.
2. Pasture + Supplement – grazing on improved New England perennial pasture plus high energy, low protein pellets (12.3MJME/kg DM, 110g CP/kg DM) at 1% live weight per day.

During the nutritional treatment the pasture available to the cattle was managed so cattle growth rates did not differ between the treatments. Steers were then backgrounded until feedlot entry at 18 months of age where steers were either short-fed or long-fed for 100 and 250 days, respectively. Live weight did not differ due to nutritional treatment at any stage of the experiment.

Slaughters

At the following 5 time points during the trial steers from each nutritional treatment were slaughtered at the Northern Co-Operative Meat Company, Casino NSW. The time points were:

1. at weaning before commencement of the nutritional treatment (6 months)
2. at the end of the nutrition treatment (12 months)
3. at the end of backgrounding (18 months)
4. Short-fed (21 months)
5. Long-fed (26 months)

Focus on genetics and management but not high energy supplementation

- Use of high energy supplementation immediately after weaning did not enhance chiller assessed marbling, as determined by MSA marble score (Figure 1).
- Hot Standard Carcass Weight (HSCW), subcutaneous rib and P8 fat depths and MSA marble score increased with the age of the steers for genotypes selected for high or low marbling and nutritional regime.
- High marbling genotype steers had a higher average MSA marble score cf. the low marbling genotype steers throughout the study

	Marbling genotype	HSCW (kg)		Ossification Score		MSA marble score	
		Pasture only	Pasture + supplement	Pasture only	Pasture + supplement	Pasture only	Pasture + supplement
Short-fed (100d)	Low	379	374	138	136	391	354
	High	383	386	136	138	512	483
Long-fed (250d)	Low	451	439	159	161	422	454
	High	468	460	154	159	618	575

Table 1: *Effect of Marbling Genotype, post weaning nutrition and days on feed on HSCW, Ossification Score and MSA Marble Score (adjusted for initial live weight due to differences between genotypes)*

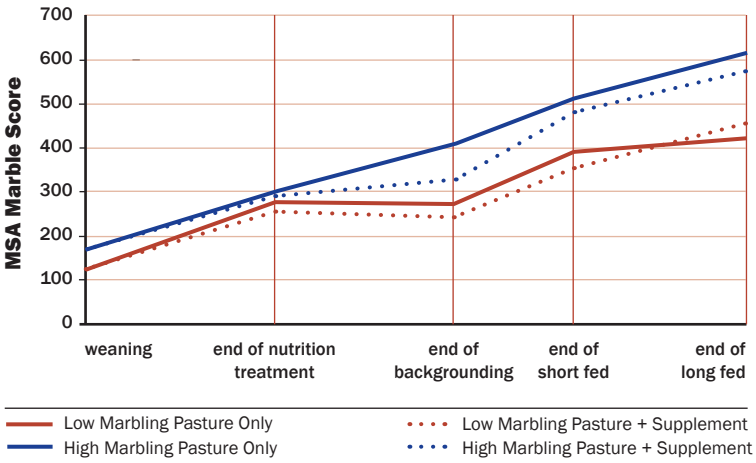

Figure 1: *Change in MSA Marble Score over time*

** Nutritional treatments imposed for 168 days post-weaning, at which point steers were backgrounded until feedlot entry*

Longer time in the feedlot (100 days vs. 250 days) was associated with increased MSA marbling score for all groups. After 100 days on feed, the high marbling genotype steers had an average MSA marbling score more than 100 points higher than the low marbling genotype steers (Table 1). After 250 days on feed, the high marbling genotype steers had an average MSA marbling score of 618 compared with 422 for the low marbling genotype steers.

Summary

Use of a high energy supplement during the immediate post-weaning period did not enhance marbling in Australian beef cattle with a high genetic capacity to marble. Breeding or buying steers with a high genetic capacity to marble and providing them high quality improved pastures post-weaning and during backgrounding is the most efficient way of ensuring feeder steers will reach maximum marbling potential.

However if post-weaning supplementation is required to meet market specifications, balance the diet for protein and energy rather than energy alone and select supplements depending on the stage of growth of the animal.

There is no advantage in feeding high energy rations as supplements post weaning to achieve a high marbling outcome.

Contact Details
Jason Siddell, District Livestock Officer – Beef Products
NSW Department of Primary Industries
444 Strathbogie Rd.
Glen Innes, NSW, 2370
Ph: 02 6730 1941 or 0459 162 295
Email: jason.siddell@industry.nsw.gov.au

Research Leader
Dr Paul Greenwood
NSW Department of Primary Industries
Beef Industry Centre
University of New England
Armidale, NSW, 2351
Ph: 02 6770 1831
Email: paul.greenwood@dpi.nsw.gov.au

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