

MARBLING IN A NUTSHELL

Cheryl Graham

FAST FACTS.....

- *Marbling is the small flecks of fat scattered throughout the muscle*
- *Marbling contributes to flavour, juiciness and tenderness, especially of grilling cuts*
- *Marbled beef is used mainly by the restaurant and food service industry*
- *A growing number of our export markets (Japan, Korea) pay a premium for marbled beef*
- *Cattle develop more marbling as they fatten, especially on high grain diets*
- *Producers can increase marbling through genetic selection and improved nutrition*

Why is marbling important?

Marbling is defined as small flecks of fat distributed through the muscle of cattle. It is important because it contributes to flavour, juiciness & tenderness.

Although it is possible to achieve good eating quality without marbling, large consumer studies with cooked beef confirm that marbling improves eating quality. This is especially true for the grilling cuts and to a lesser extent roasting cuts of beef.

Markets for marbled beef

Consumer studies also revealed that while Australian consumers liked marbled beef when cooked, they generally don't like to buy meat with visible fat in the supermarket. Therefore in Australia, marbled beef is used mainly by the restaurant and food service industry. This meat comes mainly from the short-fed feedlot market.

Japan is the major market for marbled beef. The value

of beef in Japan is strongly related to its marbling content. Newer markets for marbled beef are opening in other countries, especially Asia. Australia's third biggest export customer, Korea, has reduced their demand for grass-fed beef and increased demand for marbled, grain-fed beef.

Australia produces different levels of marbling for a range of market segments. They are commonly referred to as Short-fed B1 (100-120 days on feed, aiming for Marble score 1), Medium-fed B2 (150-180 days on feed, aiming for Marble Score 2) and Long-fed B3 (more than 250 days on feed, aiming for Marble Score 3 or better).

What influences the development of marbling?

Marbling develops readily in animals with the right genetics, when given the right nutrition.

Without the genetic potential, cattle will not develop marbling no matter how long, or how well they are fed.

Grain is much better than pasture at achieving high levels of marbling due to its higher energy levels. This is why cattle targeting the Japanese marbled market are finished in feedlots.

Breed

Some breeds are known to produce more marbling than others. As the market for marbled beef developed in the late 1980s and early 1990s, the industry quickly focused on Angus, Shorthorn and Murray Grey as the preferred breeds for the B3 segment.

The Angus and Shorthorn breeds have responded by producing bigger, later maturing cattle that have marbling genetics. Later maturity helps the steers grow out bigger and carry heavier weights without becoming too fat.

Although there are only small numbers of the Japanese Wagyu breed in Australia, significant numbers of Wagyu cross cattle are now being bred in the eastern states and are being fed for the high quality segment.

Although some other breeds are quite capable of producing marbling, the major feedlots have generally simplified their buying policy down to their choice of a few proven breeds.

Genetics

Cattle with the genetics for marbling will marble at a faster rate than cattle with lower genetics for marbling no matter what the diet. The advantage will only increase when on a high energy, feedlot diet.

The heritability of marbling is quite high, 30 to 50%. So, it is possible for producers to select for marbling just as they would for growth or fertility.

Commercial breeders are now able to use EBVs for marbling to select bulls that will improve marbling performance.

Rather than select on marbling alone, it is important to balance it with other important production traits including both male and female traits affecting total herd productivity. BREEDOBJECT enables all the available EBVs to be given a weighting according to their economic importance, and converted into a single \$ Index Value.

DNA technology

Several DNA markers associated with marbling have been identified and tests are now commercially available. An Australian company, Catapult Genetics tests for four markers associated with marbling, as well as other traits.

Bull breeders can send samples to the laboratory

where DNA is extracted and the presence or absence of the particular DNA markers is reported.

The Genestar® tests are only part of the marbling story, as the proportion of genetic variation explained by these genes is different in different breeds, and there are many other genes as well as non-genetic factors that decide the expression of marbling.

Research at Armidale's, Animal Genetics and Breeding Unit is currently under way to include DNA test results into the calculation of BREEDPLAN EBVs. The priority is to provide Australian breeders with a single, balanced EBV to guide genetic selection, rather than confusing them with bits of information on single DNA tests.

On-farm nutrition

Cattle that have been on poor nutrition prior to feedlot

entry generally have less marbling at slaughter than those that have had good nutrition. So it's important to ensure that young cattle grow steadily from birth without any significant growth setbacks. A target of 1kg/day from birth to weaning is ideal.

The period after weaning is critical. Animals should achieve minimum growth rates of 0.6kg/day from weaning to feedlot entry.

Feedlot nutrition

A few generalisations can be made about improving marbling in a feedlot.

- The higher the energy in the diet, the more animals will marble
- The longer the time on feed, the more animals will marble

- The better animals were fed before arriving at the feedlot, the more they will marble
- HGPs delay deposition of marbling, similar to the effect of a later maturing animal

Finer grain processing leads to better absorption by the animal. This makes more net energy available which leads to higher marbling. Steam flaking of grain is 'best practice' for processing of whole grains.

The Beef CRC trialed a range of diets thought to increase marbling. These included canola oil plus calcium, Rumentek™, low and high protein diets and different grains (maize, barley and oats). None of these diets especially increased marbling.

Marbling is assessed by graders accredited by Meat Standards Australia

