Size, shape and proportions

GENE TALK

Mark Young

Olympic long distance runners and sprinters can have the same fat and muscle in their bodies but look different.

Lately I have been discussing carcase merit with farmers at several events.

Some of the terms used mean different things to different people. Conceptually, the definition of carcase merit is similar for beef and sheep, so let's define important principles to bring more clarity to our discussions.

An important distinction is to separate things based on size from those based on proportions, either as weights or as shapes. Overall size is always important. Usually it is the most important thing affecting carcase value, leading to the conclusion that "a big plain carcase pays more than a small stylish one".

What can be confusing is that it is possible to have "more lean" but "not be as lean". This occurs when one animal is bigger, with a higher weight of lean tissue, but it also has a higher proportion of its carcase as fat and bone i.e. the lean % by weight is less even though it has a greater weight of lean. Likewise, you can have "more fat" (by weight) but be "less fat" (lower fat % of total weight).

So there is a clear distinction between size effects and tissue weight proportions.

Another area of confusion is around shape. The best example is the concept of muscularity. We expect that Olympic sprinters will be more muscular than marathon runners, but top athletes all commonly have low fat proportions. In fact, athletes as different in body form as sprinters and marathoners may have the same proportions (by weight) of fat and muscle in their bodies, so why do they look noticeably different?

Because weight does not describe shape. A long iron bar may weigh the same as a cannon ball. It is the thickness (a linear dimension) relative to length (a linear dimension in a different plane) that is different.

Elite sprinters have thick muscles for their length compared with elite marathon runners.

This shape effect is what makes extreme muscularity noticeable in sheep (Texel versus Merino) and beef (Belgian Blue versus Friesian) carcases.

Some people value muscularity (thicker muscles for given skeletal dimensions) because they say it is associated with better "yield". Yield typically means a higher percentage of the carcase is saleable lean tissue and a lower proportion is trimmed fat and bone not in the saleable cuts. But muscularity may not predict lean meat yield well. Sometimes animals with inferior muscularity may have a higher percentage (by weight) of the carcase as muscle.

Muscularity has value only if it is a good predictor of above-average lean yield or is valuable in its own right. If consumers and processors want "blocky" lamb legs (shorter length for the same weight) rather than "lanky" legs (same weight but greater length), and they are prepared to pay for it, the schedule should show that.

Shape is not always important. A meat scientist once told me that muscularity is of little value when a carcase is used to produce mince. And when we cut carcases into a greater number of smaller cuts, shape becomes less important. By cutting obliquely, a skilled butcher can cut steaks that look thicker than the muscle they were cut from.

A final thing to consider is "conformation". This term can mean many things. A good definition of carcase conformation is relative thickness of tissue (fat and muscle) overlying the skeleton. So it is a function of muscularity and fatness. [Live animal conformation usually covers other things as well, such as those related to physical soundness in the live animal].

So why are we naturally biased toward muscular types when assessing meat animals? Probably because "lankiness" is associated with animals that have not done as well as their "blockier" counterparts i.e. body shape is indicating animals that may have undergone weight loss (lower muscle: bone ratio?) or slower growth. But some animals are genetically lankier (I know, I'm one!) than others when run together.

As producers of lean, red meat, we need to determine whether increased muscularity indicates greater lean tissue yield or whether it has value in its own right. Talk to your meat company and to your ram breeder to find out what they think. This may help you when buying rams or bulls.

B+LNZ and SIL are interested in your views. Please feel free to tell us your thoughts by sending an email to silhelp@sil.co.nz or leaving a phone message on 0800-silhelp (0800-745-435).

Dr Mark Young
Genetics Manager for Beef + Lamb New Zealand and SIL