Here for the long-haul? Being long-lived is under-rated at the moment.

Age and wisdom

Mark Young

A recent Gene Talk column considered efficiency in maternal genotypes, the beef cows and flock ewes you farm.

The focus was on one component of efficiency - the growth rate of young animals destined for meat production compared with the adult size of their mothers - the premise being that the heavier the cow or the ewe, the more it takes to feed her, a key overhead to the farm system.

Herd or flock efficiency has another important component, maternal longevity. Obviously if cows or ewes live longer while maintaining good productivity, you need fewer replacements brought into the herd or flock each year. With fewer replacements, average age is greater, which lifts total production since younger cows and ewes produce less in their first few seasons.

As well, the rearing cost of each cow or ewe is spread over more productive seasons, reducing that cost relative to her production. Furthermore, if cows and ewes live longer, you are able to use more selection pressure when choosing replacements, which can lift productivity of the herd or flock.

So longevity is a key component of profitability and efficiency so we would be wise to include it in our genetic improvement plans.

There are lots of reasons animals do not last and "self-cull" themselves. We know that actual performance is shaped by genetics and the environment, where the latter includes farm characteristics and management. So only some self-culls are "genetic". We expect that in more challenging environments, it is harder for a cow or ewe to sustain productivity in the long term, but some animals do the job "year in, year out".

Can we select for this? The question is a good one but first we need to look at what our selection systems do.

Because these systems have a strong emphasis on traits measured early in life, and because with successful selection younger animals will, on average, be of superior genetic merit, old animals may not be favoured in selection decisions. That older animals leave more offspring for future generations helps a little but longevity is not considered directly in most selection programmes.

Criticism of modern selection tools because they favour younger animals is unreasonable given that their higher merit is a sign of success.

The issue is that we do not explicitly consider longevity in our breeding objective alongside other traits affecting profit and efficiency.

The animal breeding mantra to apply here is "if it is important, include it in the breeding objective". Only by measuring longevity and assessing genetic merit for it, can we incorporate it optimally into our breeding programmes.

We first need to define ways to measure maternal longevity and get this recorded by breeders. Because this has not been explicitly done before, there is no established and proven method for recording why cows or ewes leave the herd or flock. Many breeders have begun to record this information with SIL for their ewe flocks and we expect to have preliminary assessments of genetic merit for longevity for them within the next few years.

Early research in sheep indicates that longevity has a genetic basis with a useful heritability (20-30% in sheep), but we need to consider the extent that this is independent of other productivity and health traits.

To put the right weighting on longevity in a selection programme, we have to balance potential genetic gains made in other traits against those we could make in longevity. It is not enough to simply live long if a cow or ewe fails to rear all her offspring and looks after herself better.

And highly productive animals may not be as long-lived due to greater susceptibility to break down from the challenges they experience.

We have good systems for coping with antagonistic trait relationships in breeding programmes but we lack knowledge we need about relationships between longevity and other key traits.

With greater pressure on farms to be profitable and efficient, it is critical we explicitly bring longevity into our genetic improvement programmes.

If we begin now to record why they leave the herd or flock, we will be in a