

## **Reducing the Generation Interval to Increase Genetic Gain in Pedigree Flocks**

Samuel Boon – Signet

Pedigree breeders often ask how they can make faster genetic progress within their flocks in improving traits such as growth rate, muscling and prolificacy.

The rate of genetic change achieved within a flock is dependant on three things:

- The heritability of the trait – the degree to which the trait is influenced by an animal's genetics, as opposed to the environment in which it is reared
- The selection pressure – the relative superiority of the animals selected for breeding relative to the breed average
- The generation interval - the speed with which each generation is replaced (ideally with superior animals).

Breeders have little influence on the heritability of the trait, although the more accurately data is collected and environmental influences are taken into account – the greater the likelihood that differences in EBVs will reflect true differences in genetic merit.

Breeders can increase the selection pressure within their breeding programmes by obtaining the best, high EBV sires that they can afford (bearing in mind the ancestry of their ewes). Replacing low EBV stock ewes with high EBV ewe lambs and only selecting high EBV ewes for embryo transfer programmes.

Whilst these two secrets to success are obvious, many breeders could also decrease the generation interval within their flocks, making better use of the genetic improvement that they make each year.

### **Generation Interval in Sheep Breeding Programmes**

Generation interval is defined as the weighted average age of both parents when progeny are born. The length of time between generations can have a marked impact on potential rates of gain, particularly when the selection pressure being applied within the breeding programme is high.

The generation interval of rams is much lower than that of ewes. Rams frequently sire lambs at 12 months of age and are quickly replaced once their progeny become outclassed. Ewes tend to lamb for the first time as shearlings and stay in the flock until they are culled or die.

One way of looking at generation interval is to compare the average age of sires and dams within a population. A study completed by Signet in 2009 looked at the average age of sires and dams across a range of breeds.

Considering that terminal sire breeds typically use more ram lambs than hill breeds, the differences are surprisingly small. The generation interval is similar between breeds and no different for recorded vs. non-recorded lambs within the Suffolk dataset. Generation intervals are slightly longer for maternal breeds, which makes sense as it often takes longer to assess maternal traits.

The one exception is the Meatlinc. The generation interval for their ewes is similar to other breeds, with most ewes being retained to the end of their commercial life – but

the average age of their sires is 1.5 years vs. 2.5 years achieved in other breeds. More than half of the lamb crop is sired by ram lambs born in the previous season.

### **What is the impact of this short generation interval?**

Where a high selection pressure is applied the genetic gain achieved through the male line due to this shortened generation interval can be much greater. In the case of the Meatlinc this could theoretically result in 20% faster genetic improvement in growth rate in comparison to other breeds. Year on year this is a massive difference.

As in any progressive breeding programme rates of inbreeding still need to be managed, something that has been achieved successfully in the Meatlinc - despite it being a closed population.

### **Case Study: Thorganby Meatlinc Flock**

George Fell (age 29) is not surprised by the results. George says “In the Meatlinc Company it makes sense to optimise the use of ram lambs for breeding.

There are many advantages:

- Ram lambs provide the best genetics
- Ram costs are very low - as ram lambs are used and then sold
- We can sell the majority of our shearlings rams, providing customers with the best genetics - a proportion of which will be from proven sires
- Elite shearlings retained for wider use by the Meatlinc Breeding Company will have more accurate EBVs, which are less likely to change over time

Ram lambs are reared and managed in very commercial conditions, so at mating time they may only be 60-70kg, but neither libido or serving capacity appears to be a problem – as lambs are fit and ready to work. We ensure ram lambs are not bullied or overworked at mating time, with care taken to ensure body condition score is maintained throughout. After mating ram lambs are looked after to ensure they grow steadily through the winter period”.

George’s father Stephen Fell is pleased that the policy of using ram lambs has worked well, but is quick to highlight the importance of retaining a senior stock ram if he is exceptional. “Occasionally an older ram with exceptional EBVs can be used more widely if their breeding merit still compares favourably to that of younger rams. The advantage of these sires is that their progeny will also provide high levels of genetic linkage across years. This linkage strengthens the genetic analysis and increases the robustness of Meatlinc EBVs.”

Samuel Boon, Signet Breeding Services Email: [samuel.boon@eblex.org.uk](mailto:samuel.boon@eblex.org.uk)

George Fell, Meatlinc Breeding Company Email: [george@turf.co.uk](mailto:george@turf.co.uk)  
Tel: 07929002150

**Article originally printed in the NSA Sheep Farmer Magazine and reproduced here with their permission**

