Breeding and genetics

Today's farm

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Approximately half the gains in animal performance achieved at farm level can be attributed to superior breeding or genetics. Results from the initial phase of the Teagasc Irish and New Zealand across country genetic comparison (INZAC flock) study are showing that animals of elite genetic merit (five star ewes), regardless of country of origin, are outperforming their low genetic merit (one star ewes) counterparts.

Litter liveweight per ewe was similar at birth, but elite Irish and New Zealand ewes produced more lamb liveweight at six weeks post-lambing compared to the low Irish ewes – 27.36kg, 27.26kg and 24kg, respectively. This trend continued to weaning and subsequently, the overall length of time it takes for lambs to reach the desired pre-slaughter liveweight.

In addition to the above experiment, more recently, we have begun to look at the methane output from sheep production systems.

Agricultural livestock production accounts for 34% of greenhouse gas emissions in Ireland and therefore, the agricultural sectors are under pressure to reduce methane emissions without compromising animal productivity.

Methane emissions have never been reported for Irish sheep systems. The overall aim is to determine the impact of genetic selection on methane output and to investigate the possibility of breeding a more climate-friendly animal.

Portable accumulation chambers (PAC) are being used to measure methane output and are currently undergoing a validation experiment whereby the PAC are being compared to the 'gold standard' method of measurement, the respiratory chamber, and a robust protocol for determining the most accurate measurements is being developed.

Initial results are showing that the daily output of methane from dry hoggets is 8.6 CH4 g/day, relative to liveweight and feed intake.

Teagasc continue to work closely with Sheep Ireland to update the new genetic evaluations for sheep. The focus for 2020 was to implement genomic selection for the Irish sheep industry. Genomic selection is a new tool that can increase the accuracy when identifying genetically elite animals at a younger age and also provide accurate parentage information for individual lambs.

Genomic selection was launched for sheep in spring 2020 and has resulted in an increase in the accuracy of replacement and terminal indexes by 15% and 17%, respectively. For difficult-to-measure traits such as lamb mortality, this is the equivalent of a ram having an additional 14 progeny records.

In addition, the number of lambs born has also been updated. Until 2020, the more lambs a ewe was expected to produce, the greater the replacement index of the ewe. However, new research from Teagasc shows that once a flock's number of lambs born increases over 2.18, there is no economic benefit.

So, to reflect this in the replacement index, the reward that an animal will receive for having prolific genetics will be capped at the equivalent of 2.18 lambs. This change will only affect the most prolific animals.

Labour saving

Work is underway to include new labour-saving traits in the genetic indexes. Lambing alone accounts for over 25% of the labour requirement across the sheep farming year, more than double the labour required at any other key time like weaning, mating etc. Therefore, any measure that could potentially reduce the labour required or time spent per ewe at lambing should be considered.

Lamb vigour is a measure of how long it takes a lamb to stand after birth and is measured on a five-point scale where 1 is very poor (the lamb is still not standing after one hour) and 5 is very good (standing within five minutes).

Ewe mothering ability is a subjective measure of the ewes behaviour towards her lamb(s) and is scored on a five-point scale, where 1 is very poor (the ewe shows no interest in her lamb(s)) and 5 is very good (the ewe is very protective, licks the lamb(s) immediately, follows lamb(s) closely).

Differences existed among sire groups in the prevalence of poor lamb vigour (i.e. the lamb was not standing within 30 minutes) and poor mothering ability of their progeny. Taking lamb vigour for example, 90% of the progeny of one sire had a lamb vigour score of 1, 2, or 3, meaning these animals took at least 30 minutes to stand after birth.

A similar trend was observed for ewe mothering ability. Given that management and environment were expected to be the same for progeny of all sires in the same flocks, this would indicate that genetic differences between sires accounts for most of the difference in prevalence of poor lamb vigour or mothering ability in progeny.