Better genetics breed better lambs

TEAGASC researchers are comparing flock performance of elite genetic sheep flocks from New Zealand and Ireland and low-index Irish flocks.

The overall aim of the national sheep breeding programme is to produce low-cost, easy-care sheep with good maternal characteristics that will produce quality lambs with high growth rates, thus reaching slaughter at a younger age. This aligns with the Food Wise 2025 targets (the Irish Government's strategic plan for the development of the agri-food sector) for sheep breeding, and directly reflects the requirement of the farmer to maintain a profitable, efficient enterprise. However, the maternal characteristics of the Irish national flock remain sub-optimal, with average weaning rates reported to range from 1.3 to 1.43, and lamb mortality rates of over 15% reported in many flocks. Despite widespread evidence highlighting the positive impact of maternal sheep breeds on flock performance, the widespread use of terminal breeds in the national ewe population continues to exacerbate the low maternal performance of the national flock.

Genetics for breed improvement

Utilising genetics in animal production systems is a powerful method that enables farmers to select superior animals to become parents of future generations. Genetics involves the passing of genes (favourable and unfavourable) from parents to offspring; therefore, genetic effects are permanent and cumulative over time. The aim of the Sheep Ireland €uroStar index is to provide commercial sheep producers with an additional tool for the selection of genetically-superior breeding animals. Similarly, the New Zealand national genetic breeding programme allows producers to select animals with superior maternal characteristics. A recent study has shown that the rate of genetic gain achieved in New Zealand (€1.16/lamb per year) was more than four times higher than the genetic gain achieved in the Irish maternal index (€0.27/lamb per year). This has been a major contributor to New Zealand maintaining lamb output, despite a 50% reduction in their national ewe flock over the past two decades. Therefore, the INZAC (Irish and New Zealand Across Country) flock was established with the dual objective of firstly validating the national maternal breeding index and, secondly, comparing Irish and New Zealand genetically-elite animals within an Irish grass-based production system.

INZAC research experiment

The INZAC flock was established at Teagasc, Athenry, Co. Galway, between 2014 and 2015, with the purchase of ewes and rams from Ireland and New Zealand. Irish-bred animals, originating from farms with a Sheep Ireland data quality index (DQI) of >60%, were selected based on the genetic potential of their parents, grandparents and great-grandparents within the maternal line for the replacement €uroStar index. New Zealand animals were within the top 30% of their dual-purpose index and had well-established links to the central progeny test farms within the New Zealand breeding programme. Ewes and rams were selected from a total of eight New Zealand farms, across both the north and south island, and from both upland and lowland enterprises. The flock consists of 180 ewes split into three treatment groups (n = 60): elite New Zealand ewes; elite Irish ewes (genetically superior); and, low-index Irish ewes (genetically inferior). Two main breeds, Texel and Suffolk, are equally represented within each experimental group, as shown in **Figure 1**. Texel and Suffolk represent the two most commonly-used terminal breeds within Ireland and, by default, Texel and Suffolk genetics also represent a large amount of the Irish commercial ewe population. The Texel and Suffolk breeds are also used within the New Zealand sheep industry and, therefore, were chosen for use within the INZAC flock.

The experiment commenced in autumn 2015 when the ewes were mated within their treatment groups using artificial insemination (AI), and will run for a four-year period. Although all INZAC animals

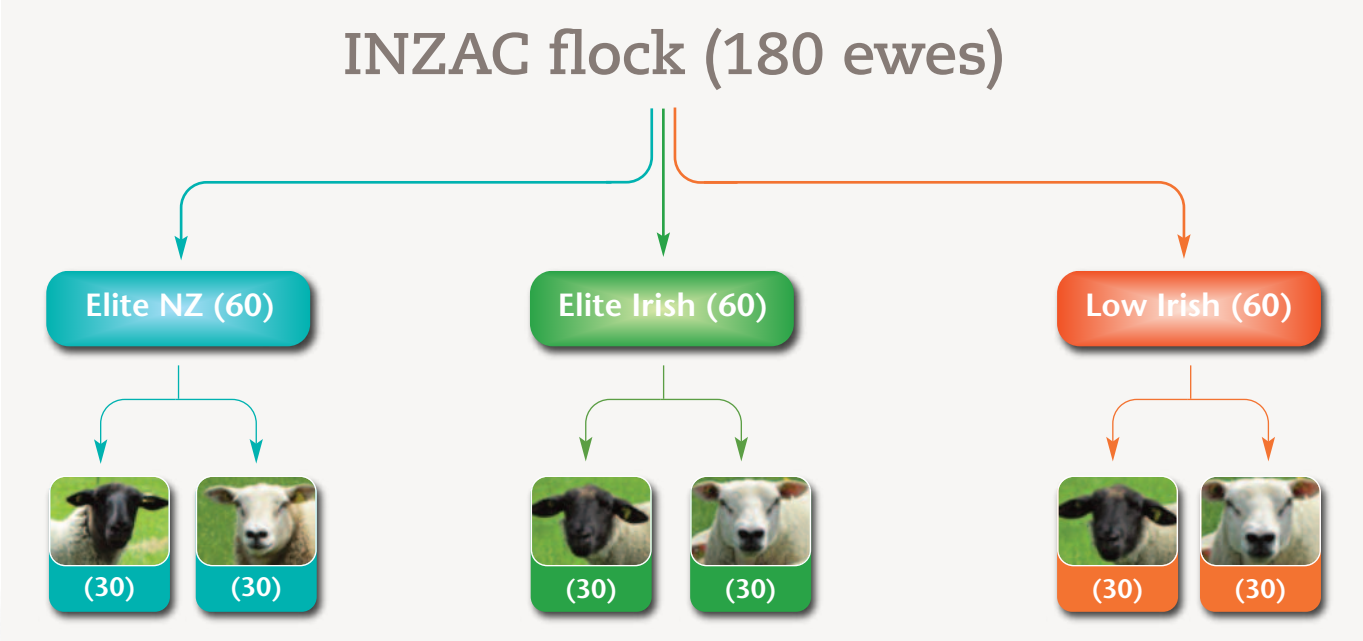

FIGURE 1: INZAC flock structure.

are pedigree animals, an objective of the flock is to maximise the proportion of grass in the flocks' diet; therefore, no concentrates are fed to ewes or lambs once animals are turned out to grass.

The experiment is a systems study, with each group stocked at 12 ewes/ha and each paddock receiving 130kg of nitrogen (N) fertiliser/ha per year. Each treatment group is rotationally grazed throughout the grazing season (March to December). Throughout the study, various aspects of both animal performance (e.g., lambing difficulty, milk yield, ewe weight and body condition score (BCS), lamb weight) and grassland parameters (e.g., herbage utilisation and feed intake) are being investigated.

Animal performance results

Although the INZAC experiment is only in its second year of a four-year study, results to date indicate New Zealand ewes have had higher scanned litter sizes (1.85 vs 1.75 vs 1.66 for the New Zealand, elite Irish and low Irish ewes, respectively) and gave birth to lighter lambs with a lower lambing difficulty, when compared to the other two groups. Interestingly, the elite Irish and New Zealand ewes have higher lamb survival rates.

Pre weaning, elite Irish and New Zealand lambs had a higher growth rate recorded within the first 100 days of life and were, therefore, heavier at weaning. The New Zealand and elite Irish ewes had higher measured milk yield than the low-index Irish ewes, which contributed to the superior lamb performance during the rearing period. Post weaning, lambs within the New Zealand and elite Irish groups had higher average daily gain (ADG), and subsequently higher lifetime ADG, when compared to the low-index Irish lambs. Consequently, low-index Irish lambs took significantly longer to reach target slaughter weight when compared to elite Irish lambs (14 days shorter) and New Zealand lambs (23 days shorter). This further resulted in a lower percentage of low-index Irish lambs being drafted from grass.

Results to date show that irrespective of origin, animals of high genetic merit outperform low genetic merit animals, thus highlighting the importance of genetic selection and the use of the Sheep Ireland maternal breeding index.

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