Red Meat Topic Sheets: Genetic Gain in the Essie Flock

CT Scanning, Genomic Gain, and Market Payoff

Key findings:

- Selective breeding in the Essie flock has led to lambs finishing over 20 days faster than in the early 1990s, reducing production costs and environmental impact.
- Use of advanced tools like ultrasound and CT scanning enabled improvement in carcase traits, increasing muscle depth and yield at lower weights.
- Genetic improvements have translated to an estimated £5 higher market value per Essie-sired lamb compared to average Suffolk lambs.
- Genomic testing significantly enhances the accuracy of breeding values (by 10–20 points), accelerating identification of elite breeding stock and boosting genetic gain.
- Combining data-driven selective breeding with genomics delivers faster, more cost-effective genetic progress and stronger market payoffs.
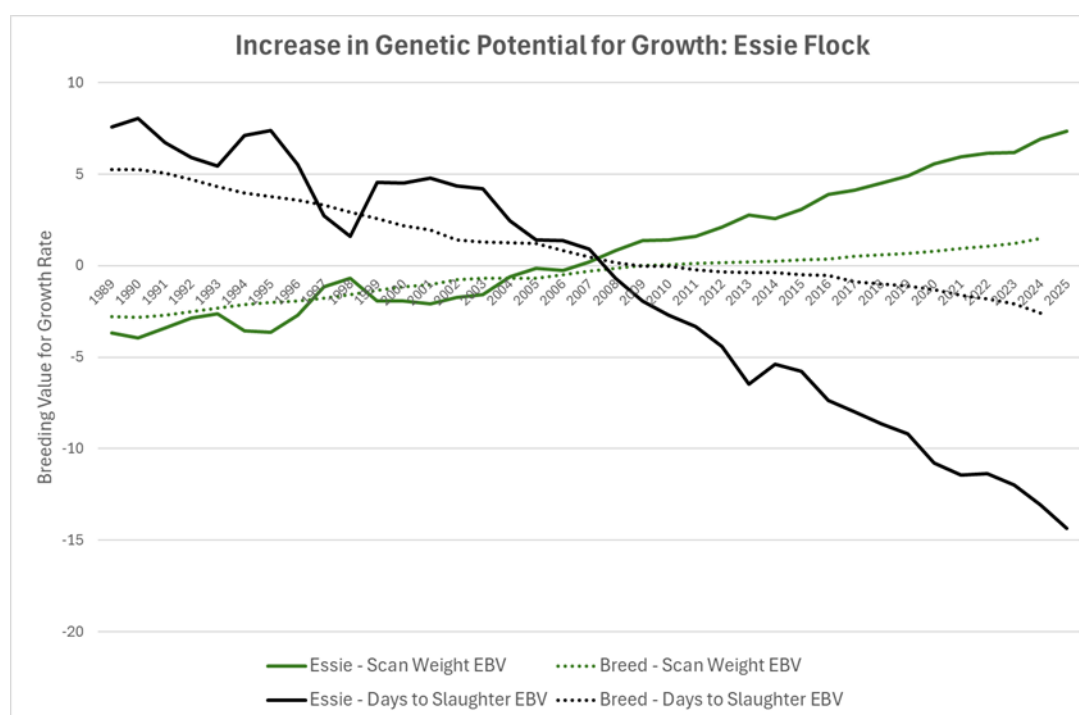
Background

The Essie flock began to record weights and pedigree records in 1989, using the Signet genetic services which QMS jointly supports. At the time, the flock was an average Suffolk flock compared to the rest of the Suffolk breed in the UK which was registering about 40,000 lambs a year. To pursue and achieve a unique selling point and set themselves apart from the other animals available in a crowded marketplace, the Essie

flock looked to selective breeding. They focused on the traits which were important to their customers and were directly connected to market reward: growth rate and carcase conformation.
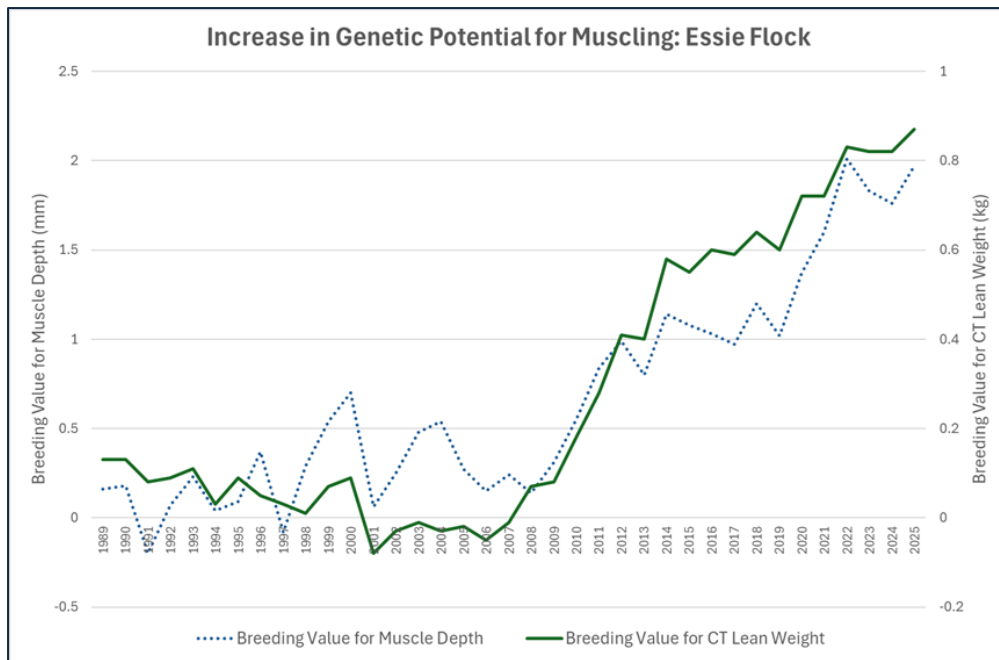
Genetic Gain

Consistent use of selective breeding has had a massive payoff for the Essie flock. The average lamb from the Essie flock is predicted to finish over 20 days faster than those genetics that were being sold in the early 90s.

These animals have the potential to go to market sooner and reduce the overall cost of production. Additionally, the environmental impact of the animals has lessened across successive generations. The improving trend is displayed in the graph below.


While it may be possible to select for growth by looking for the largest animal, carcase traits are slightly more complex. Only by using ultrasound and computed tomography (CT) scanning, the flock has been able to improve these traits as well. The potential for yield from the carcase has improved by 0.8kg and the depth of muscling across the loin has increased by nearly 2mm at a fixed sale weight.

Increase in Genetic Potential for Muscling: Essie Flock

Achieving Greater Muscle Depth at Lower Weights for Increased Value

Before the Essie flock began to make significant genetic gain, they were getting similar muscle depths from lambs weighting 65-75kg. Now they are able to achieve the same muscle depth at 40kg. Overall, these gains correlate to an estimated difference of £5 extra in the carcass value from Essie sired lambs compared to the average. Data driven decision making has been the key to their success.

Increase in Carcase Value: Essie Flock
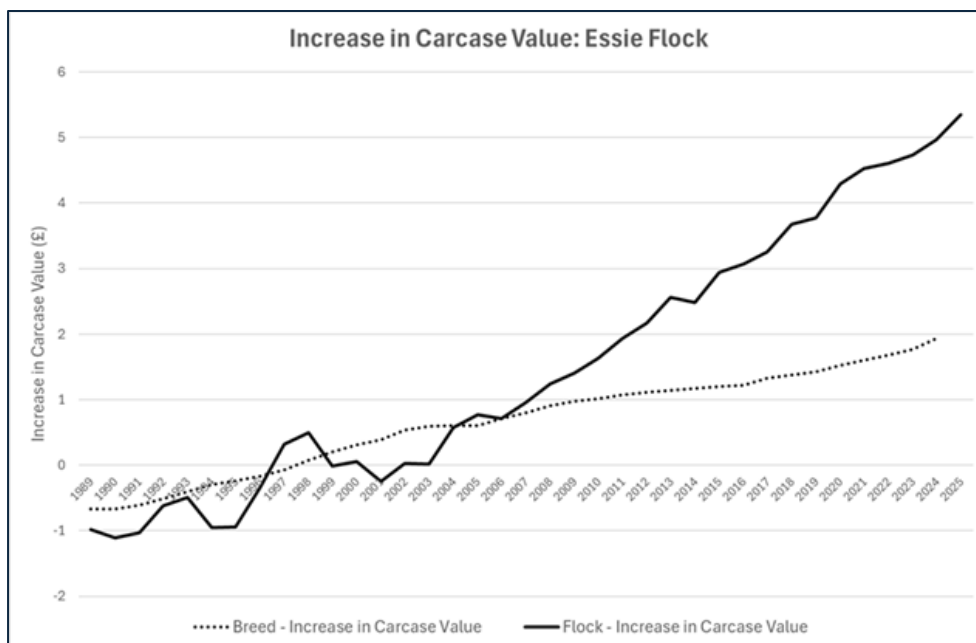
Genomics Improves Gain:

In addition to benefitting from selective breeding, the Essie flock has also been using genomics to improve the accuracy of their breeding values and fast track genetic gain. The new genomic All stock rams are genotyped with the Suffolk Sheep Society. Additionally, QMS supports CT scanning for ram lambs and genotyping for stock ewes in the Essie flock. This service has provided immense benefit for the Essie flock, giving them a snapshot of the genetic makeup of their flock.

Genotyping is a great way to increase the accuracy of breeding values and improve the accuracy of the genetic decisions the breeder makes. The Essie flock already has much higher accuracy values than the average Suffolk animal included in the Signet database. However, the application of genomics is lifting these accuracy values by 18,10 and 20 points for lean weight, fat weight and gigot shape respectively. This is a major increase in accuracy and helps improve the identification of elite rams for future breeding.

Genomics is vital for improving the Suffolk breed's CT traits and overall carcase yield. These are highly heritable traits but they are expensive to measure. Genomic services make it possible to access highly accurate breeding values for these traits that have

major payoff in the marketplace. The chart below shows the overall increase in accuracy.

Average Accuracy of Breeding Values				
	CT Lean Weight	CT Fat Weight	CT Gigot	Index
Average Suffolk 2024/2025 bred ram on Signet database (ungenotyped)	40%	46%	33%	47%
Average Essie sale ram (ungenotyped/non-CT)	58%	70%	48%	72%
Average Essie sale ram (CT scanned and waiting for genomic results)	65%	73%	51%	75%
Average Essie sale ram (CT scanned and genotyped)	83%	83%	71%	84%

Where values of 99% would typically be achieved for stock rams with hundreds of progeny.

Summary

- Data Collection and Selective Breeding has major impact on the speed of finishing – improving payoff and reducing environmental impact.
- Genomics makes genetic gain cheaper and faster

Small steps towards selective breeding can have huge long term benefit.