

Red Meat Topic Sheet: Breeding For Carcass Traits In Focus: Sheep

Key Traits for Economic and Environmental Growth

Key Findings

- **Genetic selection works:** Over 30 years of focused breeding for carcass traits has delivered major gains in growth, yield, and overall profitability.
- **Proven financial return:** Genetic improvement for carcass traits contributes around £15.5 million annually to the UK beef and sheep industries.
- **Strong progress across breeds:** Charollais and Hampshire Down sheep show steady improvement in carcass conformation, weight, and fat class through selection.
- **Efficiency gains:** Reduced days to slaughter — by up to six days — are cutting production costs and lowering environmental impact.
- **Ongoing potential:** Substantial genetic variability remains, meaning further improvements are achievable through continued selection.

Background:

Genetic evaluations for sheep breeding focused on carcass composition have proven highly profitable. Growth and carcass traits are the primary drivers of improved returns within breeding programmes.

Over the past 30 years, genetic selection for these traits has delivered substantial gains. Growth and carcass composition are positively correlated, and the presence of both within- and across-breed variability means ongoing selection continues to deliver results (Fitzmaurice, 2021).

Genetic improvement for carcass traits contributes an estimated **£15.5 million** per year to the UK beef and sheep industries (SignetFBC, 2019). Studies show significant variability in live weight and carcass composition at both phenotypic and genetic levels (Simm et al., 2002; Jones et al., 2004; Rius-Vilarrasa et al., 2008), confirming that further genetic progress remains achievable in popular UK terminal sire breeds.

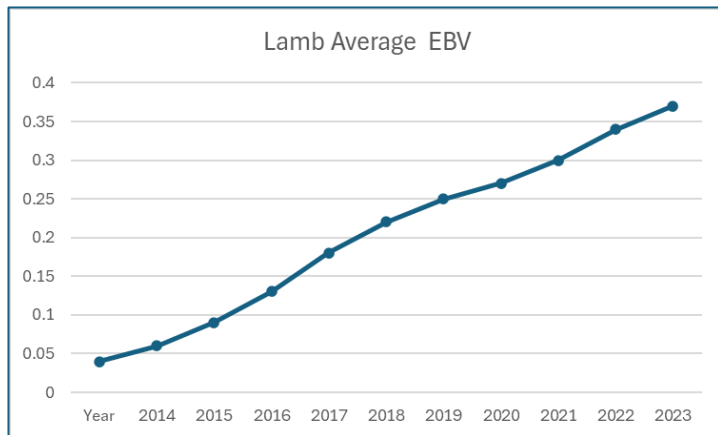
Progress

The combination of financial success and continued genetic variability led to the creation of the UK's terminal progeny testing programme, **RamCompare**. Jointly funded by UK levy bodies, RamCompare tests terminal sire genetics on commercial farms.

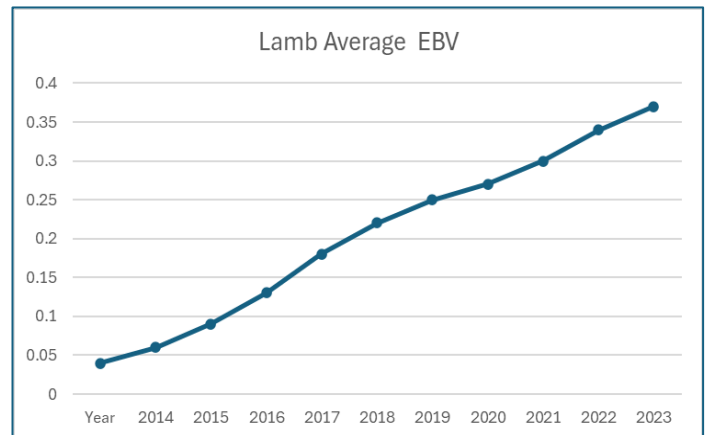
To date, the project has tested **503 rams across 17 terminal sire breeds**, producing over **48,000 lambs**. This enables farmers to select high-performing sires with proven genetics for improved carcass composition and reduced production costs.

Average Estimated Breeding Values (EBVs) for two popular terminal breeds — **Charollais** and **Hampshire Down** — show steady genetic progress across multiple carcass traits.

Carcass Conformation Genetic Trend for Charollais Breed:



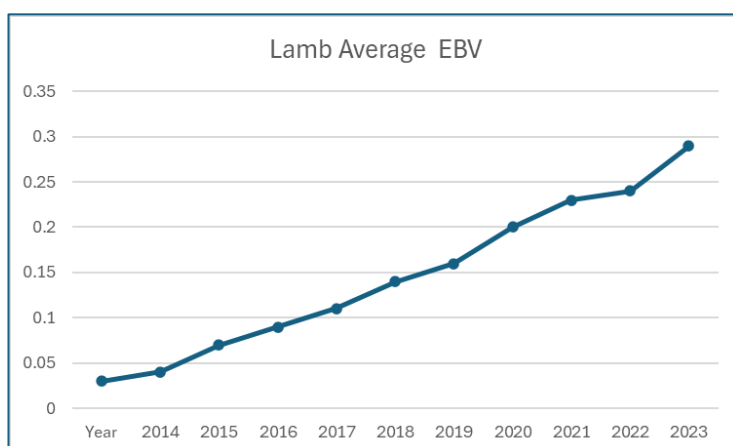
Carcass Conformation Genetic Trend for Hampshire Down:



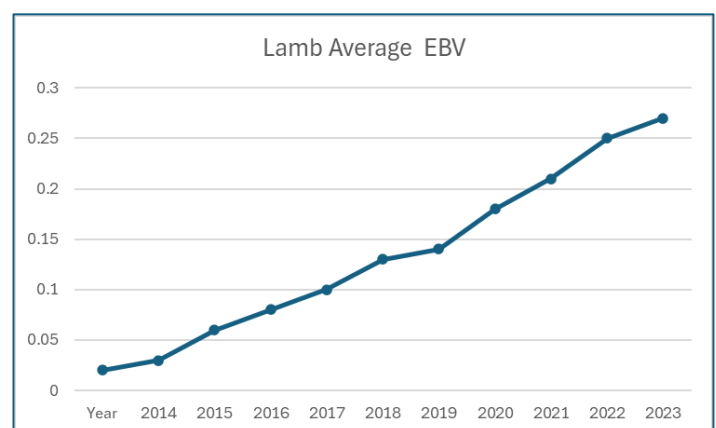
Interpretation:

The average EBV for Charollais lambs has shown a steady increase under selection pressure for carcass conformation. A similar pattern is seen in the Hampshire Down breed, which experienced a slight early decline before rising consistently to +0.12 by 2023. The conformation score is based on the EUROP grid, converted to a 45-point scale, with each grade spanning around nine points. In practical terms, a ram with a carcass conformation EBV of +9 is expected to produce progeny with conformation scores around half a grade higher than those from a ram with an EBV of 0.

Carcas Weight for Charollais:



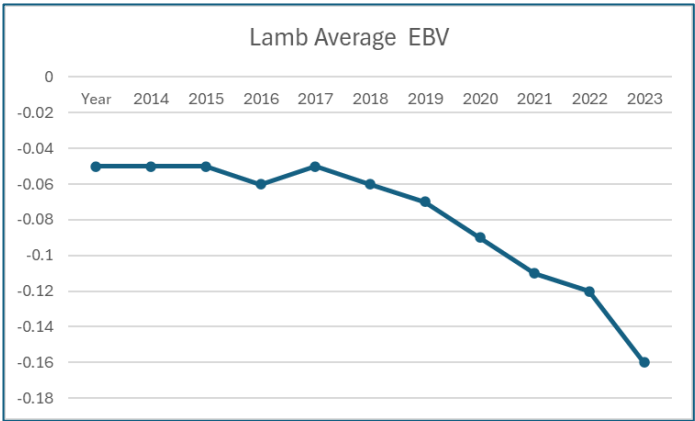
Carcass Weight for Hampshire Downs



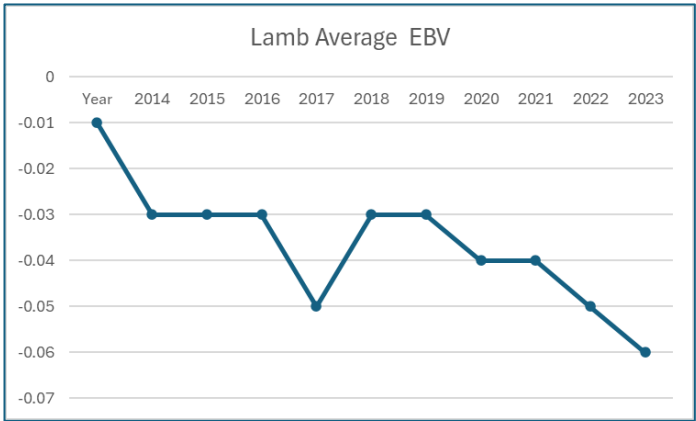
Interpretation:

The average EBV for carcass weight has increased in both the Charollais and Hampshire Down breeds under continued selection. Each breed is approaching a gain of around 0.3 kg, which directly translates to improved carcass yield and better returns at the abattoir.

Fat Class for Carollais Breed:

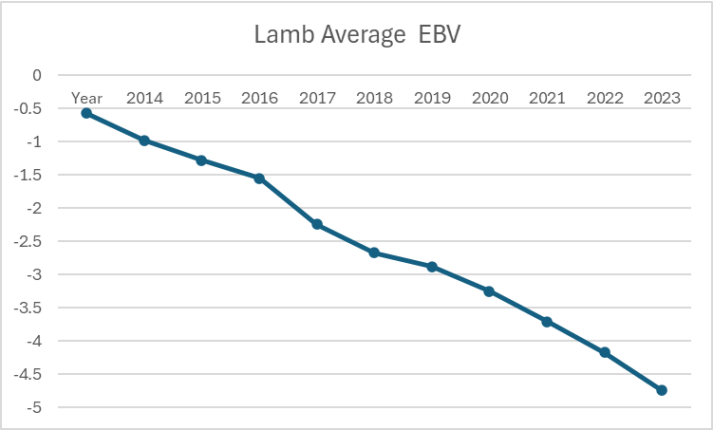


Fat Class for Hampshire Down Breed:

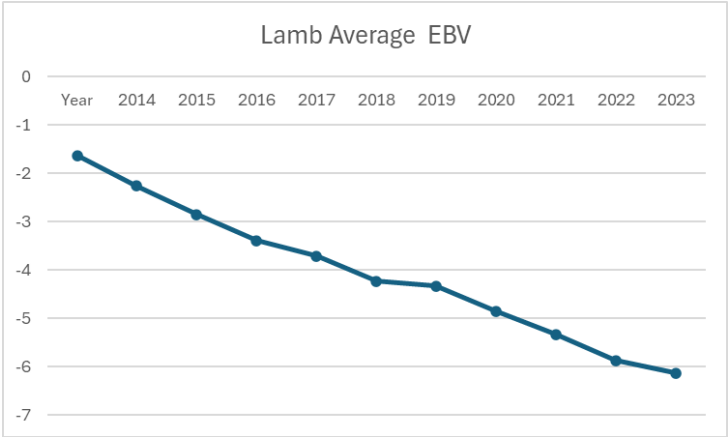


Interpretation: The Fat Class EBV has been under selection pressure for leaner carcasses. Here both trends show that the leaner carcass has been achieved in order to accord with consumer preferences and ultimately pay back the producer.

Days to Slaughter for Charollais:



Days to Slaughter Genetic Trend for Hampshire Down:



Interpretation:
Both breeds show clear genetic progress in reducing days to slaughter. This offers a direct benefit to producers by lowering feed and management costs while reducing the environmental footprint. Genetic trends suggest a potential reduction of around six days in both breeds.

Conclusion
Selective breeding for carcase traits has proven highly effective, with all key traits showing positive genetic progress. These improvements are driving greater profitability and a reduced environmental impact, and ongoing selection will continue to deliver strong gains for the sheep sector.