Livestock Research Notes
SAC

Sustainable genetic improvement of hill sheep

Background

Hill sheep breeds have a role as breeding females in their own right, as well as producing crossbred ewes and lambs for meat production. As they are kept in the harshest locations in the UK, potentially there is a conflict between their need for body fat reserves for survival and lactation, and the demand for lean, high quality meat from their lambs. Traditionally, hill sheep have been selected by eye to suit the type of hill environment in which they are reared. However, there are considerable differences in the performance of animals both between and within flocks, highlighting the potential for genetic improvement.

Breeding goals

New breeding indices that combine important components of productivity for 'being a good ewe' and those important for 'being a good lamb' were developed at SAC in collaboration with the Roslin Institute. The breeding goals also include lamb survival and ewe longevity, which are important for sustainable breed improvement. Two indices are currently being tested on two SAC hill farms using three genetic lines, or strains of Scottish Blackface sheep. These are: (i) Selection line, using animals with the highest index score for breeding; (ii) Control line, using animals with average index scores; (iii) Industry line, using animals selected by traditional visual methods. The use of the three selection lines enables us to determine whether changes in performance are as a result of genetic improvement or due to other factors such as improvements in management and nutrition.

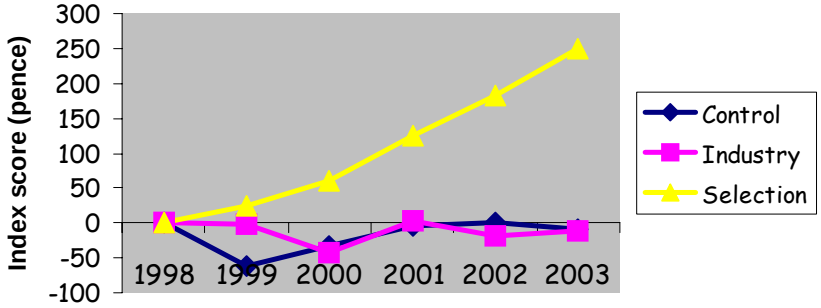

Figure 1: Responses to selection at Kirkton Farm

SAC receives financial support from the Scottish Executive Environment and Rural Affairs Department

Key results

After 4 years of selection, differences in performance between the lines are apparent on both farms, with Selection line animals out-performing both Industry and Control-line animals. Lambs from the Selection line at Castlelaw farm are significantly heavier (800 g) and are worth more (£2.03) at slaughter compared to Control line lambs. Selection line lambs at Kirkton are also heavier at weaning (770 g).

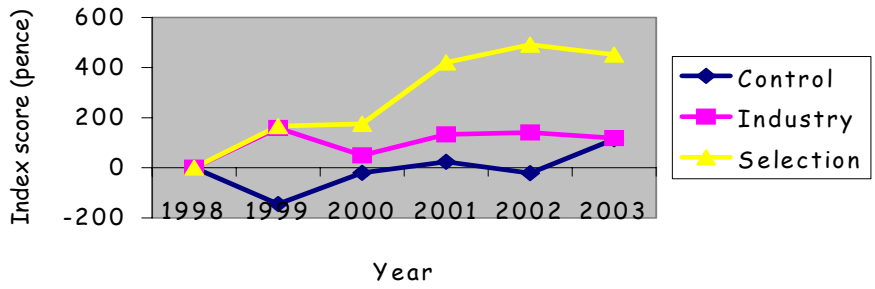

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Figure 2: Responses to selection at Castlelaw

Industry relevance:

- Combining maternal and carcass traits means that selection is simplified although response in each trait is slower than if fewer traits are used in index construction.
- Including ewe longevity and lamb survival (as a trait of the ewe) has broadened selection to ensure that higher-performing ewes are not bred at the expense of their ability to survive and rear their lambs.
- Since 2000, the index used at Castlelaw farm has been used in the main hill breeds in Scotland and England via Signet, the provider of on-farm genetic improvement programmes.

New breeding goals using CT

A new 4-year Defra-funded project to investigate the best use of CT (Computed Tomography) in co-operative hill breeding schemes is now underway with the aim of accelerating responses in carcass quality, without compromising maternal characteristics.

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Research Sponsors: Department for Environment, Food and Rural Affairs, Scottish Executive Environment and Rural Affairs Department, Meat and Livestock Commission and the British Wool Marketing Board

SAC Reference Number: 521145