GENTORE

Universitat de Lleida

INRAE science for people, life & earth

Will the most efficient heifer be the most resilient cow?

The use of simulation models in identifying the possible trade-off between efficiency at young age and resilience as a suckler cow

Problem

The efficiency could be estimated using data from growth and intake at young ages (i.e. using residual feed intake approach). But the resilience of cows (defined here as the ability to produce a heavy weaned calf every year) is difficult to evaluate from real data without biases. So sometimes it is not easy to assess the trade-off between efficiency at young ages and resilience as adult suckler cows.

Solution

We used data from an experiment at INRAE that has information about the growth and feed intake of Charolais heifers and performance as a cow of the same animals under different feeding regimes. This data allowed the calibration of a simulation model. We classified animals according to their efficiency as heifers into groups. The cow-calf model developed in the project was used to simulate the performance and resilience of the different groups under a scenario of nutrient restriction (decrease in quality and quantity of summer pastures expected by climate change).

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Outcome

We found that the most efficient heifers had more variability in the weight of calves at weaning under the climate change scenario and were therefore less resilient in that condition. The group that includes the less efficient animals as heifers had higher production (higher weaning weight of their calves) and was also more resilient in terms of the calving rate (less variability between years). On the contrary, the animals most efficient as heifers were also more efficient and more resilient in economic terms (showing less variability in herd profit before grants) as cows.

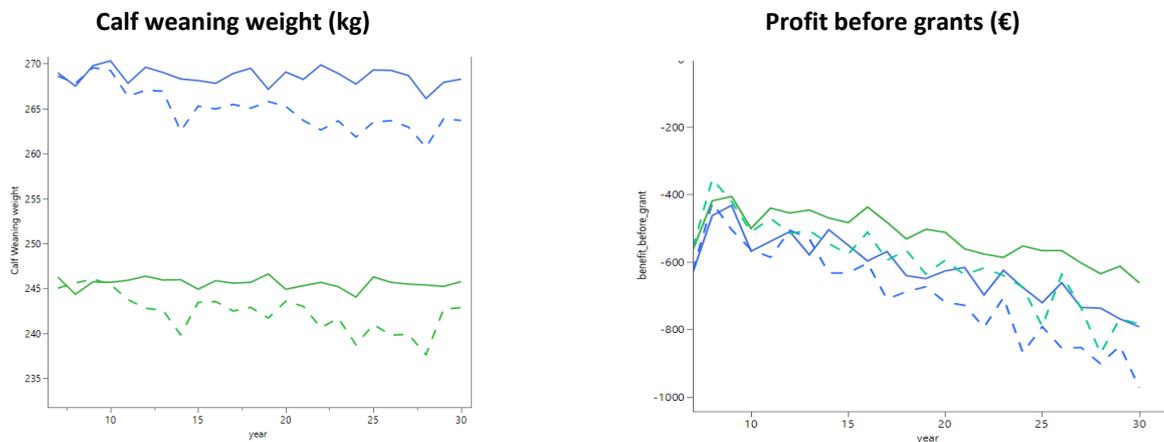Calf weaning weight (kg)   Profit before grants (€)

Figure 1 Simulated outputs (mean of the herd results) of cows classified when heifers as efficient (HE, in green) and less efficient (LE, in blue). Results obtained during 20 years in a scenario of variability in summer pastures quality and quantity (dotted lines), compared with non variability scenario (solid lines). For production, the high growth potential and intake of LE cows allows them to take profit of calf supplementation, and so have higher weaning weight and less variable with years under variability scenario. On the contrary, when expenses on supplementation are accounted, HE cows have better economic and more resilient performance

PRACTICE ABSTRACT

Practical recommendations

Efficiency at young ages and resilience as adult suckler cows could have a trade-off, but it depends on the output evaluated. This trade-off should be evaluated under a herd evaluation approach to detect which animals are more suitable for a specific livestock system.

On-farm application

The model approach is not for direct use at the farm level, but could be very useful for evaluating and planning of strategies and forecasting consequences in the discussion between advisors and farmers.

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