

Cow Own Worth – synergising data to provide a new tool to aid in culling decisions in seasonal dairy herds.

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Abstract

The ability to identify cows with the highest future profit potential will have a substantial impact on herd profitability and efficiency. The objective of this study was to rank dairy females on expected profit for the remainder of their lifetime, taking cognizance of both additive and non-additive genetic merit, permanent environmental effects, and current states of the animal including the most recent calving date and cow parity. The cow own worth (**COW**) is a decision support tool that was developed to aid producers in making informed decisions on dairy females for culling and retention.

The framework of the COW consisted of the profit accruing from 1) the current lactation, 2) future lactations, and 3) net replacement cost differential. The COW was generated from estimated performance values (**EPV**; sum of additive genetic merit, non-additive genetic merit and permanent environmental effects) of traits, their respective net margin values, and transition probability matrices for month of calving, survival, and somatic cell count; the transition matrices were to account for predicted change in a cow's state in the future. Transition matrices were generated from 3,156,109 lactation records from the national database between the years 2010 and 2013. Phenotypic performance records for 162,981 cows in the year 2012 were used to validate the COW. A pilot group of 85 commercial herds were recruited in 2016 to trial the COW and to conduct a survey on the potential delivery of an added service to milk recorded herds.

The Pearson correlation between individual animal COW value and national breeding index (EBI) value was 0.65. Month of calving in the current lactation explained 18% of the variation in the COW with parity explaining an additional 3 percentage units of the variance in the COW. Females ranking higher on the COW yielded more milk and milk solids and calved earlier in the calving season than their lower ranking contemporaries. The difference in phenotypic performance between the best and worst quartiles was larger for cows ranked on COW than cows ranked on EBI.

The response rate to the survey was 52%. The results indicated that 91% of respondents would use the COW to help inform culling decision if it were to become a routine service from the Irish Cattle Breeding Federation. Furthermore, 91% of participants felt that their milk recording information had more value because the COW was available to them. Overall, 98% would recommend the national extension of the COW to all dairy milk recording herds in 2017.

The COW is a useful management tool to rank dairy females for culling decisions. COW integrates multiple sources of available data, and critically, is complementary to the EBI which identifies the most suitable females for breeding replacements. The COW offers future prospects to improve herd profitability by adding value to existing services such as milk recording and genotyping of dairy females. In order to maximise the efficiency of the COW,

farmers need to fully engage in on-farm data recording for example inseminations, pregnancy diagnosis, and health (e.g. mastitis and lameness) events.

Keywords: culling, milk recording, genetic, permanent environment