THE ECONOMIC VALUE OF CHANGES IN 21-DAY PREGNANCY RATE AND WHAT CONTROLS THIS VALUE
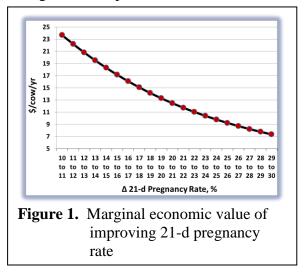
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No single metric can describe comprehensively dairy cattle reproductive efficiency. A best approximation could be the 21-day pregnancy rate. Estimating the economic value of 21-day pregnancy rate is complex and difficult. One approach is to use Markov-chains as underline framework. Markov-chains can simulate the dairy herd dynamics of the interactions of reproduction, abortion, involuntary culling, mortality, and voluntary culling. Therefore, it is possible to find a herd structure matrix resulting from a defined 21-day pregnancy rate. The resulting herd structure indicates for example the herd's proportion of cows by parity, days after calving, and pregnancy status. Therefore, the value of a 21-day pregnancy rate can be estimated by the multiplication of the herd structure matrix by their net returns. Cow specific net returns can be estimated as the aggregation of milk income, feed costs, culling costs, mortality costs, new born value, and reproductive costs.

The marginal economic value of successive 21-day pregnancy rate 1% increments from 10 to 30% is depicted in Figure 1. These values represent a specific set of herd parameters and market conditions under constant reproductive costs. A marginally decreasing trend is noted. More economic value gains are expected for lower 21-d pregnancy rates. A total economic gain value of improving several percentage points can be estimated by accumulating individual 1% 21-day pregnancy rate increases. For example, improving 21-d pregnancy rate from 15 to 20% would represent an approximate economic gain value of $75.7/cow per year. This value is primarily controlled (in order) by: milk income over feed cost, new born value, reproductive cost, and culling and mortality costs.

Figure 1. Marginal economic value of improving 21-d pregnancy rate

These economic gains may be under estimated. Improved reproductive efficiency (represented by greater 21-day pregnancy rates) would attain a greater farmer's ability for selective culling. Selective culling would have an impact on herd's milk production and productivity. Additional assessments among reproductive efficiency, selective culling, and herd's lactation curves are then warranted.

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