

Economic Benefits of Individual Cow Management

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With increasing herd sizes, farmers have moved from individual cow management to group management, thus simplifying management and reducing the workload. By using proper health and reproduction protocols, decisions can and have been optimized at the group level. In the 1980's and early 1990's, ideas have been generated to optimize decisions at the level of individual cows. The uptake in the field of these optimization algorithms has been low until so far. The use of these algorithms seemed to be too complex or too demanding for herdsman to take up. Currently, computers and personal digital devices (PDA's) are finding their way in dairy farming. This makes on-line decision support at the cow level, and thus individual cow management, feasible. Even with the use of current technology, individual cow management does require more resources, so the economic benefits should be known. Two examples of the economic benefit of individual cow management, calculated using bio-economic stochastic simulation models, are given in this contribution. Input for these models was based on scientific literature and the authors' expertise.

Antibiotic Treatment of Clinical Mastitis

Simulations were made of cases of clinical mastitis for different cows, caused by different mastitis pathogens. For each of these cases, the total costs of 4 different antibiotic treatments (standard intramammary, extended intramammary, combination intramammary + parenteral, and combination extended intramammary + parenteral) and immediate culling were compared. Bacteriological cure for each individual cow depended on the choice of treatment, the causal pathogen and several cow factors (parity, SCC and CM history). Total costs for each individual case were dependent on treatment costs, milk production losses and costs for culling.

The mean costs for clinical mastitis, including the treatment, varied from € 169 (\$US 231) to € 211 (\$US 289) per case. The average most optimal treatment was the standard intramammary treatment. The average most expensive treatment was the combination of extended and parenteral treatment. The optimal treatment, however, differed for individual mastitis cases. For, respectively 65, 23, 10 and 1 % of the CM cases the standard intramammary, extended intramammary, combination intramammary + parenteral and combination extended intramammary + parenteral antibiotic treatment was optimal. For, on average, 1% of the cases of clinical mastitis, immediately culling was optimal. In general, for cows producing more than 35 kg (77lbs), for cows with previous cases of clinical mastitis and for cows in the first months of lactation the more intensive antibiotic treatments became more advantageous. Also for cows with *Staphylococcus aureus* mastitis, it is more often optimal to combine intramammary and parenteral antibiotic treatment.

Voluntary Waiting Period

Another frequently taken decision is the moment to start with insemination, the voluntary waiting period (VWP). In the simulation model, conception rate of individual cows was based on cow

characteristics, such as milk production and parity (Inchaisri et al., 2010). Simulating the reproduction cycle of individual cows with different parity, lactation curves (level and persistency) and reproductive disorders, it became clear that for 38 % of the cows, the shortest VWP possible (6 weeks) is optimal. For more than 90 % of the cows, a VWP of less than 80 days is optimal and for a small percentage of cows a longer VWP is optimal (Figure 1). The calculations showed also that the economic consequences (in terms of annual net economic losses per cow per year) become larger with increasing VWP. One element not taken into account in these calculations, at this moment, is the fact that early insemination might lead to a too high milk yield at calving, which has negative effects on the health of cows.

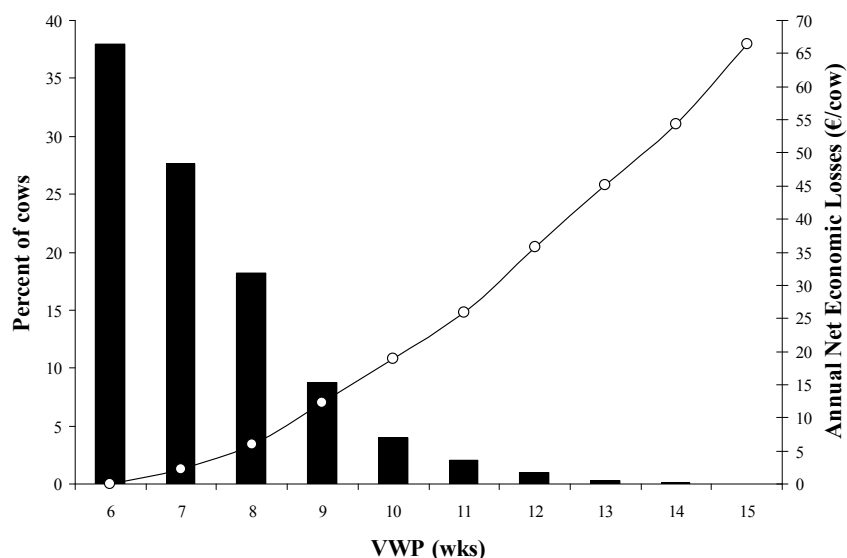


Figure 1. Frequency distribution of optimal voluntary waiting period (VWP) for different cow factors and economic values (bar graph, left axis) and average of annual net economic losses (€/cow; € 1 = \$US 1.37) for different VWP relative to a VWP of 6 weeks (line graph, right axis).

Concluding remarks

In both mastitis management and reproductive management, taking decisions at the cow level has advantages. With herd sizes of today, differentiating management between cows is not a practical thing. However, with current technology, e.g., use of PDA's in herd management, possibly coupled to sensors to detect estrus or mastitis, differentiating management between cows might become easier to apply. By replacing group management with individual cow management the cost price of milk can be decreased. Development of good algorithms to do this becomes then essential.

Reference

Inchaisri, C, R. Jorritsma, P.L.A.M. Vosa G.C. van der Weijden and H. Hogeveen, 2010, Economic consequences of reproductive performance in dairy cattle. Submitted.