Assessing the relationship between dairy cow cleanliness and bulk milk hygiene on organic and conventional farms

Ellis, K. A.[1], Mihm, M.[2], Innocent, G.[1], Cripps, P.[3], McLean, W. G.[4], Howard, C. V.[5], Grove-White, D. H.[3]

[1]Division of Animal Production and Public Health (E-mail: k.ellis@vet.gla.ac.uk) and [2]Division of Cell Sciences, Faculty of Veterinary Medicine, University of Glasgow. [3]Division of Livestock Health and Welfare, University of Liverpool Faculty of Veterinary Medicine. [4]Department of Pharmacology & Therapeutics, School of Biomedical Sciences, University of Liverpool. [5]Centre for Molecular Biosciences, University of Ulster.

Background

- Hygiene scoring records the degree of contamination of cows with dirt & faecal matter
- Cow cleanliness is affected by housing conditions and diet

Aim

To investigate whether cow cleanliness was associated with:

1. The hygiene parameters of milk
2. The clinical mastitis incidence

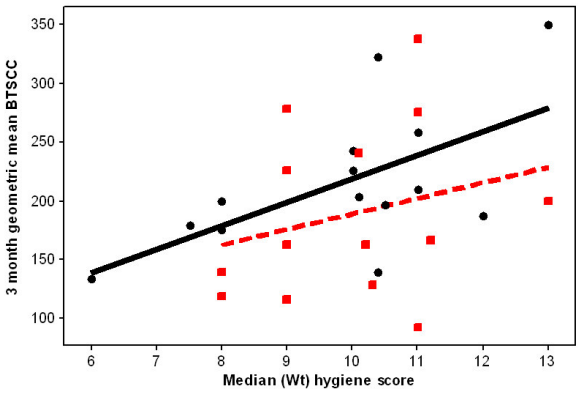
Materials and Methods

- 28 dairy farms (14 organic & 14 conventional) visited January 2004
- One observer hygiene scored a representative sample of cows from each herd (cows scored on ordinal scale of 4-20)
- A median lactating cow hygiene score was calculated for each herd
- Monthly bulk tank somatic cell count (BTSCC) & Bactoscan (BS) data were collected; 3-month (Jan-Mar) geometric BTSCC and 2-month (Jan-Feb) BS means calculated
- Clinical mastitis data collected from farm records; mean monthly case rate/100 cows in milk calculated (Jan-Mar)
- Bulk tank milk samples were submitted for bacteriological culture
- Hygiene score data were ranked by BTSCC, BS and mastitis incidence with the top quartile of herds compared to the bottom using a Mann-Whitney test.
- Regression analysis of BTSCC vs. median herd hygiene score for organic and conventional farms

Results

- The quartile of herds with the lowest cell count tended to a lower (cleaner) median cow hygiene score (p=0.06)
  - Lowest BTSCC quartile (124,000 cells/ml) cow hygiene score = 9
  - Highest BTSCC quartile (294,000 cells/ml) cow hygiene score = 11
- Hygiene score and BTSCC association differed between organic and conventional farms (Figure 1)
- Organic farms R^2=0.38 (p=0.02), conventional R^2=0.06 (p=0.38)
- There was no significant association between hygiene score and BS count or mastitis incidence
- No major mastitis pathogens were cultured from the cleanest quartile of herds, but major pathogens were cultured from 3 herds in the dirtiest quartile

Figure 1. Association between cow hygiene score and BTSCC (■=conventional farms, ●=organic farms)



Conclusions

•Hygiene score is not merely a cosmetic issue and is associated with BTSCC and therefore, sub-clinical mastitis

•Organic farms, which use fewer antimicrobials and no blanket dry cow therapy, should emphasise clean cow management as part of sub-clinical mastitis prevention

Acknowledgements

The farmers who participated in this study, the University of Liverpool Farm Animal Practice and Professor David Taylor (University of Glasgow). This work was funded by the Organic Milk Suppliers Co-operative.