**Investigation of epidemiology and diagnostic methods for control of *Mycoplasma bovis* in dairy cattle**

Liza Rosenbaum Nielsen and Mette Bisgaard Petersen, Department of Large Animal Sciences, University of Copenhagen

**Background**

Since 2011 there have been around 40-60 diagnosed *M. bovis* outbreaks per year meaning that 1-2 % of the dairy herds are hit every year. In addition, some large dairy farms and specialised slaughter calf producers appear to have continuous problems with animals becoming ill with *M. bovis*-associated disease. Compared to the previous decades, the outbreaks from the last 5 years have been characterised by varying and serious clinical signs including arthritis leading to severe lameness in calves, young stock and cows, otitis media in calves and young stock, and several cases of apparently incurable pneumonia and mastitis. The reason for this outbreak of infection or increased ability to cause serious disease is unknown in 2011 and there was not much to be gained from foreign studies. This has led to several research projects being conducted over the last 5 years. The purpose of this talk is to provide an overview of research on the prevalence of *M. bovis* in Denmark and new knowledge relevant to the control of *M. bovis* in cattle herds.

**Can bulk tank milk antibody measurements be used for herd classification in a control programme?**

A frequently used cost effective element in preventing the spread of infection between herds through trade of cattle in Denmark is classification of dairy herds based on the measurement of antibodies (ELISA) or PCR reactions in the bulk tank milk. Whereas we may get a good idea about the occurrence of the infection by adjusting for lack of sensitivity and specificity in such a test, it requires a reasonable trust-worthy and accurate classification of herds for the method to be useful for disease prevention in practice.

Completely risk-free trade can never be achieved with animals, but a positive test result should preferably reflect that there is a significant risk of infection in the herd (also called positive predictive value). On the other hand a negative response should ideally reflect that there is no significant risk of infection in the herd. One study was carried out at in research collaboration between the National Veterinary Institute and the Department of Animal Sciences. It showed that positive and negative predictive value of bulk tank milk ELISA could be optimized by using a cut-off of 50 ODC% when screening the whole population to obtain prevalence estimates (Nielsen et al. in press, doi: 10.1016 / j.prevetmed.2015.08.009).

However, a second study with repeated bulk tank milk samples from a smaller set of farms showed that it is not appropriate to use only a single bulk tank milk sample for herd classification, and there is often little correlation between ELISA and PCR reactions in bulk tank milk for *M. bovis*. The two test methods should be seen more as complementary rather than either-or, and perhaps it is necessary to work with grey zones requiring follow-up testing in the herds. It also showed that infection in calves and young stock is not reflected in the bulk tank milk antibody levels, and it is important to be aware of if young stock are traded or taken to cattle shows. A poster of the study can be found under ‘Petersen.pdf’ on http://www.svepm.org.uk/posters.html, and an international publication is in the peer-review process.

**How to control *M. bovis* in practice?**

In a master thesis project by Lene Jensen in the Fall 2014, a survey of farmer reported clinical *M. bovis* outbreaks was used to characterise the outbreaks occurring over the last 5 years with respect to duration and occurrence of clinical signs. This showed that outbreaks tend to be reasonably short, on average 4 months. However, some farms reported experiencing very long ‘outbreak’ periods, up to years. The information about management and housing was collected in the survey, and a risk factor study was performed.

It showed that the use of sick boxes for sick cows and good sectioning of different age groups of calves and young animals are very important to prevent outbreaks. There was also a correlation between having many employees and the risk of experiencing a prolonged clinical outbreak. It is advisable to provide good instruction of all employees of the daily care of the animals and hygiene routines in the herd. Pasteurization of milk for calves is recommended, if the cows affected by an outbreak as the infection will quickly spread to the calves through the milk. Antibiotic treatment must be done early in the course of disease, and pain relief should be provided for sick cows and calves. Mycoplasma hurts! It requires good monitoring of the animals several times a day go through an outbreak of *M. bovis*. Sick cows must be isolated from the group and generally should be culled.