Mastitis Review 2009

Results from the Endell Lab

The results for the mastitis samples submitted to the Endell lab are summarised in Figure 1, Figure 3 and Figure 4. The aim of this report is to summarise the results for 2009 and pull out anything we can learn.

For comparison the 'standard' published figures are shown in Figure 2; although the results of the UK appear dramatically different to those from our lab, the relative proportions of the individual organisms are similar and the difference is likely to be the result of skewing due to the elevated number of 'mixed' (contaminated) samples.

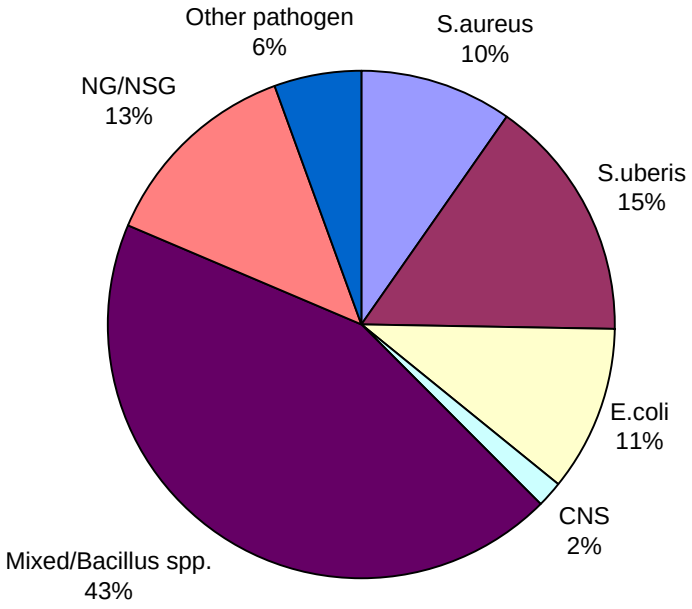


Figure 1 - Summary of submissions to Endell Vets for mastitis in 2009

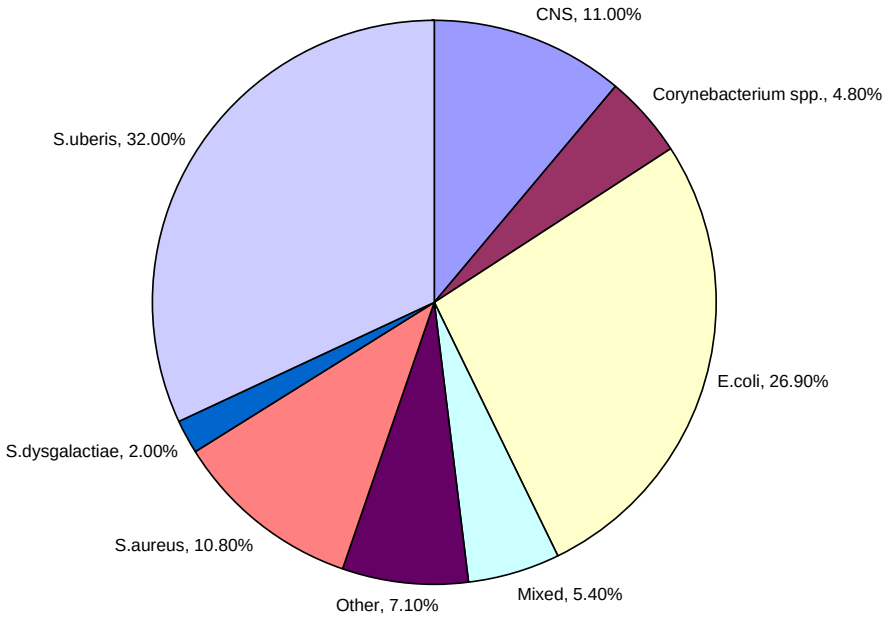


Figure 2 - Prevalence of bacterial species implicated in clinical mastitis for the UK (Bradley, Leach et al. 2007)

'Mixed' growths (43%)

The most striking observation is the number of 'mixed/Bacillus' isolations. A 'mixed' growth suggests that the sample has been contaminated during collection, it is generally accepted that the rate of sample contamination can be reduced to <5% when care is taken (see 'Sample collection to reduce contamination' later).

'No Growth/No Significant Growth' (NG/NSG; 13%)

These occur when no organisms are cultured or very few suspect contaminants are present. There are two main causes for mastitis samples and one for subclinical samples.

Clinical mastitis

1. The mastitis has resolved. It is likely that this was an *E.coli* mastitis which has been neutralised by the cow's immune system.
2. The organisms present have been destroyed during transit. Components of the cow's immune will continue to function after the sample has been collected and organisms can continue to be destroyed, these again are most likely to have been *E.coli*. The recovery of *E.coli* from frozen samples will be naturally reduced due to the absence of a true cell wall, 30-40% of NG/NSG are believed to be the result of *E.coli* loss during transit.

Subclinical mastitis/High SCC samples

S.aureus will be intermittently shed as micro-abscesses in the udder rupture and *S.aureus* is released – consequently whether *S.aureus* is recovered is dependant on whether abscesses rupture as the sample is collected.

Contagious Pathogens

There appears to be no seasonal trends in the isolation of contagious pathogens (Figure 3 and Figure 4) despite an expected reduction during the summer when cows are at grass – this may reflect the types of farms submitting samples (more samples are received from the more intensive units where cows spend less time at grass).

Coagulase Negative Staphylococci (CNS; 2%)

CNS are a normal inhabitant of the teat end and consequently sources vary as to whether they are thought to directly cause mastitis. It is most likely that colonisation with CNS during the dry period predisposes to *E.coli* and *S.uberis* infections later in the lactation. The isolation of CNS alone from a clinical case of mastitis should be interpreted with care.

***S.aureus* (10%)**

There are two common presentations of *S.aureus* infections:

1. Mild mastitis. This usually then develops into the chronic form.
2. Chronic mastitis. Following a mild cases of mastitis (which may or may not be noticed) a chronic infection becomes established as the organism burrows into the udder and forms abscesses. The rupture of these abscesses then causes a peak in SCC and can also present as mastitis (cell counts as abscesses rupture can oscillate between <200,000cells/ml to >1,000,000cells/ml day-to-day).

Environmental Pathogens

The prevalence of *S.uberis* and *E.coli* isolations increases during the late summer/early autumn period which is likely to represent the weather we suffered during that period (cows being re-housed and re-turned-out) (Figure 3, Figure 4). The peak in *S.uberis* isolation in the late summer may represent the 'camping' phenomenon which has been observed in hot conditions (where cows 'camp' under trees to escape the heat encouraging flies and faecal contamination).

***S.uberis* (15%)**

S.uberis has been classically categorised as an environmental pathogen, however recent work has suggested that some strains can behave in a contagious manner – some farms will have strains of *S.uberis* which can behave contagiously whereas other farms will not.
S.uberis is certainly the most talked about pathogen in the industry currently, this is likely to reflect its increasing prevalence and also the reduction in the importance of contagious pathogens due to the impact of the '5-point plan'. *S.uberis* infections are often difficult to treat; this is not usually a consequence of antibiotic resistance but a factor of treatment as most courses are not sufficiently long.
The treatment and impact of *S.uberis* will be discussed in mush greater detail by Andy Biggs MRCVS at a meeting on the 28th April 2010.

***E.coli* (11%)**

There are three main presentations of *E.coli* mastitis; milk changes only, milk and udder changes and sick/toxic cow. The most common presentation is the second where milk and udder changes are present.
As discussed earlier (''No Growth/No Significant Growth' (NG/NSG; 13%)' p.3) the prevalence of *E.coli* is likely to be under-reported due to loss during transit. Treatment of *E.coli* infections is relatively straightforward (in-fact a large proportion will have been self-cured by the immune system by the time the mastitis is noticed) and antibiotic resistance is uncommon.
Due to the ubiquitous presence of *E.coli* in the cow's environment prevention is dependant on good general hygiene and milking routines. Vaccination has previously been available (and is likely to return) and was licensed to reduce the severity of infection ('Envirocor', Pfizer), however new a new vaccine is likely to be available in the New Year ('StartVac', Merial) which is likely to be licensed to reduce the prevalence – however due to the ubiquitous nature of *E.coli* (and the cost and hassle of vaccination) significant reductions in the clinical case rate will be required to justify its expense (Envirocor required a 50% reduction in the number of acute cases and a 66% reduction in fatalities to be cost-effective!).

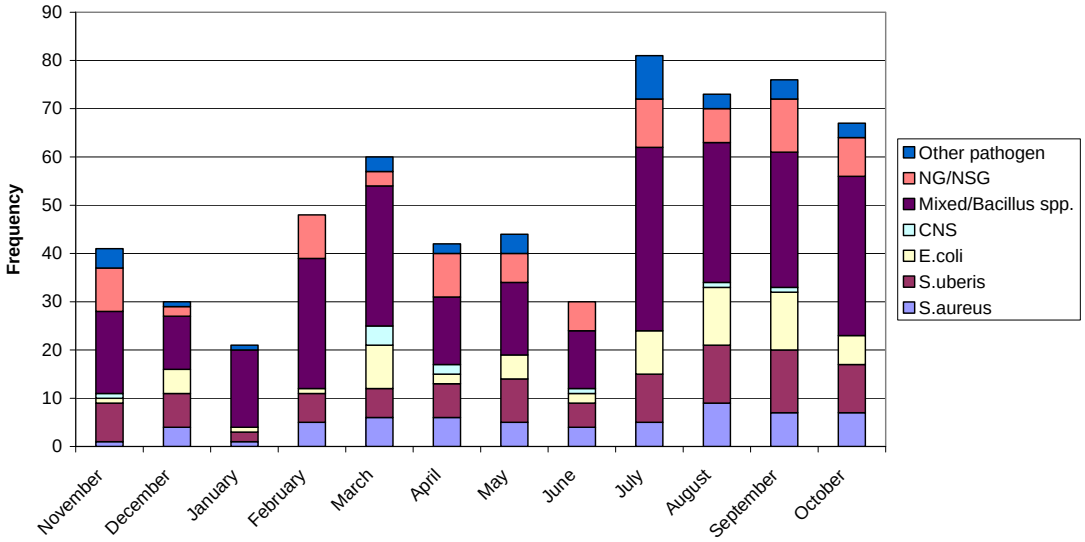


Figure 3 – Summary by month of submissions to Endell Vets for mastitis in 2009

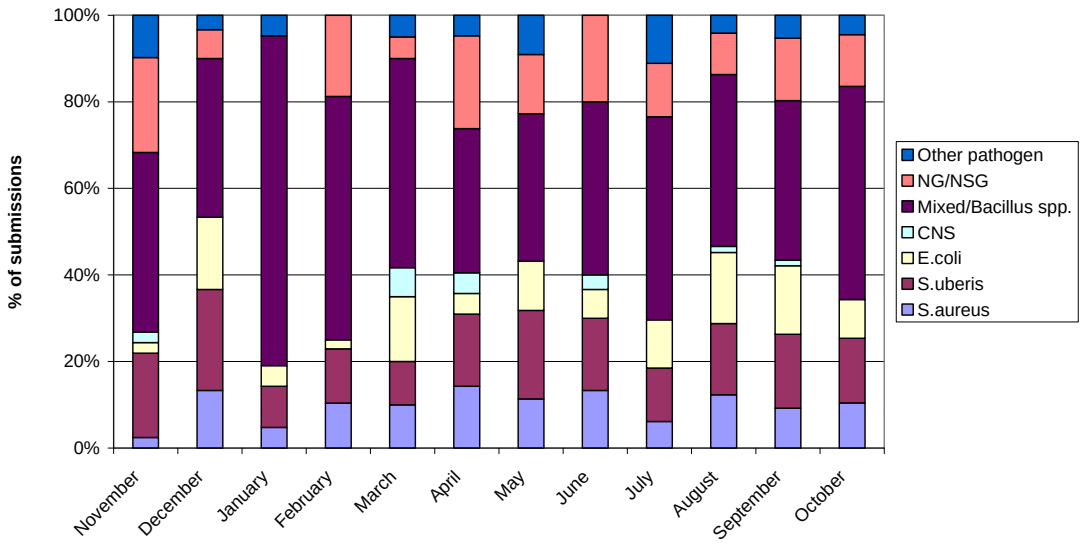


Figure 4 - Summary by month of submissions to Endell Vets for mastitis in 2009

Using bacteriology

The use of bacteriology should form part of the standard head health plan and the responsible use of antibiotics. Generally it has two main applications and these will be discussed in further detail below.

1. Identification of the causal agent at an individual quarter level.

This application is possibly over-used. Culture takes a minimum of two days; therefore samples taken from clinical cases Monday-Thursday and immediately submitted for culture should allow identification of the organism and the treatment protocol to be changed accordingly.

2. Surveillance

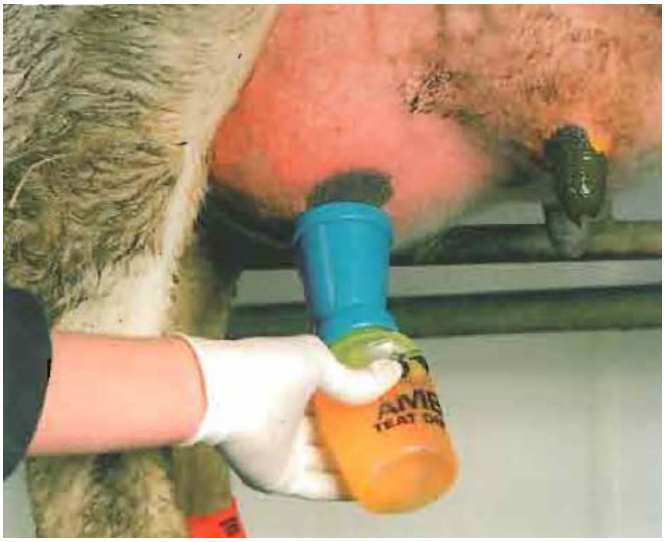
Possibly under-used. Freezing samples from all clinical cases prior to treatment and culturing 25% of them quarterly allows the pathogens present on the farm to be monitored and informed, cost-effective changes to the treatment protocols to be made.
It also allows changes to be made to the environment, milking routine and dry cow therapy as required to reduce the incidence.

References

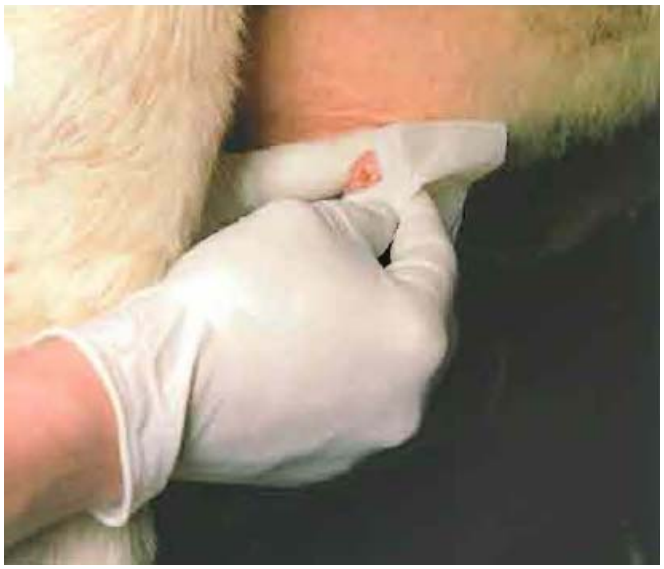
Bradley, A. J., K. A. Leach, et al. (2007). "Survey of the incidence and aetiology of mastitis on dairy farms in England and Wales." Vet Rec. 160(8): 253-258.

Sample collection to reduce contamination

1. Only sample cases prior to milking and treatment.
2. Wear clean disposable gloves.
3. If the teats are obviously dirty then dry wipe.
4. Dip the teats in a rapid acting pre-milking teat dip (preferably high free-iodine content).



5. Wipe the teat clean.
6. Scrub the teat end with a surgical spirit or mastitis tube wipe.



7. Discard the first 4-6 strips from the teat.
8. Hold the sample tube as horizontally as possible (to prevent dirt dropping into the tube) and collect 2-3 strips only.
9. Apply post-milking teat dip.
10. Label the sample with cow ID, date and quarter affected.