

Cross sectional investigation of *Coxiella burnetii* following parturition: A new spotlight on a neglected zoonotic disease in Scotland

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Suboptimal fertility and increased rates of post-partum reproductive disease was reported by a high producing commercial Scottish dairy farm in 2021. The farm tested positive for *C. burnetii* in bulk tank milk by PCR and ELISA. The objectives of this study were to investigate the within-herd prevalence of *C. burnetii* on this commercial dairy farm and identify variables associated with pathogen shedding.

A 900-cow dairy farm in Scotland was recruited in this study following positive screening for *C. burnetii*. Vaginal swabs were collected from post-partum cows during routine checks performed within seven days of parturition. Samples were stored in DNA/RNA shield, heat treated at 70°C for ≥ 1 hour then processed. DNA extracts were qPCR tested for *Coxiella burnetii* using an IS1111 assay, an insertion sequence found 5-100 times in its plasmid. qPCR assays were run for 40-45 cycles. Samples were considered “negative” if they did not amplify or amplified with a Ct ≥ 40 . If amplification occurred with Ct values 35-40 samples were considered “inconclusive”. Samples with Ct values 27-35 were considered “positive” and samples with Ct values < 27 were further classified as “high load positive”.

A total of 324 swabs were collected between Dec 2022 and Jul 2023, of which 310 (95.6%) had detectable *C. burnetii* with Ct ≤ 40 . Of these, 17 (5.2%) swabs were classified as “inconclusive”, 232 (71.6%) swabs were classified as “positive” and an additional, 61 (19.8%) swabs were classified as “high load positive”. All primiparous cows scored Ct < 40 . Linear models to identify variables associated with Ct values observed excluded animals with no *C. burnetii* amplification and primiparous cows due to small sample size. Multivariable analysis identified a significant positive relationship between Ct and 305-day mature equivalent yield (OR: 0.00) and a negative relationship with “days in the close-up pen” prior to sampling (OR:-0.11).

qPCR data indicates diffuse shedding in the herd and many animals shedding high concentrations of bacteria. The association between increased milk production (higher 305ME) and higher Ct (lower bacterial loads) indicates potentially important production impacts of infection. Further investigation should take place to assess herd-wide effects of coxiellosis.