CLINICAL IMPACT of *MYCOPLASMA BOVIS* in NEW ZEALAND
RESEARCH PROJECT 2018/19
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OBJECTIVES

This study investigates the clinical impact of *Mycoplasma bovis* infection on cattle farms in NZ and assesses any management or husbandry practices that were considered potential risk factors for disease expression. This understanding will be important for determining disease mitigation steps to be applied if this disease was to become endemic in the future. Of note is the unique aspect of the research where all infected properties are evaluated for disease as compared to research where only properties showing clinical signs are surveyed.

Data was collected on the estimate of prevalence of clinical disease on infected farms, particularly syndromic disease that has been associated with *M. bovis*. Mortality rates and antibiotic usage were also assessed as an indirect assessment of disease that could indicate impact from *M. bovis*.

DATA COLLECTION

All infected properties (IPs) were eligible for inclusion in the study, regardless of the type of farming system, and their stage in the response i.e. whether they had been depopulated or were still an ongoing enterprise. An IP is defined as a farm on which PCR detection of *M. bovis* DNA has been made. Two questionnaires were used – one for dairy farms and one for calf-rearing and dry-stock systems. Where possible, data was collected for the 2014/15 season through to the 2017/18 and 2018/19 seasons to enable intra-farm comparison pre and post *M. bovis* infection.

The dairy farm questionnaire drilled into clinical syndromes - mastitis incidence (number of cases, seasonality, number in more than one quarter, number non-responsive to treatment, number with no results on milk culture etc), lameness (joint swelling/arthritis, non-responsive lameness, etc.), pneumonia, abortions, other disease – e.g. conjunctivitis, metabolics, infections. Other indicators of herd health such as somatic cell count (SCC), production, Bovine Viral Diarrhoea status (BVD), and Restricted Veterinary Medicines (RVMs) prescribed by their vet were also included. Management and husbandry questions centred around milking shed hygiene and practice, housing, feed input, cow condition, mating practice and fertility parameters.

The drystock/calf-rearing questionnaire included questions on clinical signs such as respiratory disease, joint ill, conjunctivitis, otitis, scouring and infections. Management factors included calf shed design and stocking rate, colostrum and milk feeding regimes, productivity, growth rate and drenching routines.

All clinical signs reported by a farmer on an IP were recorded, as for most farms the records do not distinguish whether signs were caused by *M. bovis* or other concomitant disease.

Data was obtained from 69 IPs. Of these, data was collected through farm visits (n=31), phone calls (n= 24) and using existing information only (n=14). Farms were geographically distributed through the North Island (n=9), Canterbury (n=22), Otago (n=24) and Southland (n=14). Farms classified as dairy farms (n=25), calf-rearers (n=37), drystock - dairy support or dairy/bull beef (n=27), lifestyle

(n=4) and feedlot (n=1). If a farm had more than one enterprise it was classified under the stock type that was infected with *M. bovis*. Data was collated and entered into Epi-Info.

CLINICAL RESULTS

DAIRY FARMS

Of 25 dairy farms surveyed, 13 had no discernible disease attributable to *M. bovis* in the milking herd i.e. the farmers "didn't even know it was on the property".

There was one herd that showed dramatic clinical disease with 50% non-responsive multiple quarter mastitis in the dry cow mob, severe forelimb arthritis and mastitis in the milking herd and significant losses in milk production. Two other farms in the same enterprise had increased mastitis (responsive and non-responsive) but not to the same severity. Another large multi-platform farm also showed substantial levels of non-responsive mastitis, predominantly in one herd only.

Four other farms had intermittent mastitis issues over the 2015/16 to 2017/18 seasons but these cases were generally antibiotic-responsive with bacteria other than *M. bovis* cultured on milk samples. For all these farms there were underlying factors involved (e.g. inclement weather, milking machine faults, delayed detection due to change in management, and reduction in milking frequency approaching drying-off.).

Two farms had one or two cows affected with undiagnosed forelimb arthritis with no other clinical signs. Pneumonia in adult cows was not a predominant clinical feature on any dairy farm although some cows from infected farms had signs of pneumonia on necropsy. Abortion was not seen other than the premature calving and increased early calving/stillbirths on the two farms with severe mastitis. To this point in time exploratory analysis of baseline data on SCC and milk production (kg/ms) has not indicated a negative effect of *M. bovis*; however, further analysis will be conducted in the future.

CALF-REARERS

The clinical picture on calf-rearing units and home dairy farms was ambiguous. Of 37 calf-rearers surveyed, only one has shown the dramatic disease syndrome of weak, ill-thrifty premature calves with high neonatal mortality rates and a 'dummy calf' syndrome. However, another large multi-platform property did describe a moderate degree of ill-thrift and neonatal mortality in calves in one of its herds, with the other herds showing negligible disease.

Fifteen properties had moderate levels of calf disease including respiratory signs/pneumonia, scouring, ill-thrift and high mortality rates – up to 90%. Of these calf-rearers, almost all were diagnosed with rotavirus, cryptosporidia, coccidia, parasitism or a combination of the above. MPI veterinarians conducted further testing and post-mortems on several of these farms. Many of these properties were subject to movement restrictions which is likely to have contributed to heightening disease severity.

One dairy farm had ear tag infections in 20% and navel ill in 10% of their replacement calves which did not respond to antibiotics; however, the causal agent of these signs was not investigated.

Two large calf-rearers (not formally classed as IPs but with stock that subsequently tested positive as heifers in 2017) experienced profound disease. One calf-rearer of 3000-3500 calves had a difficult 2016 season with calves with poor weight gain, 25% respiratory infections, 10-20% otitis media, 20% forelimb arthritis (often with both forelimbs affected), 50% conjunctivitis, 25% ear tag infections and 20% neck/jaw abscesses. These levels of disease were unprecedented on the farm. Another calf-rearer experienced 30% mortality and 30% pneumonia out of 470 calves, unexplainable by other causes.

DRYSTOCK

Drystock aged from 3 -4 months to R2s have shown little disease. The occasional farm had stock with mild coughing and ill-thrift which often responded to drenching, suggesting parasitism. One farm had poor growth in yearling calves with respiratory signs, coccidiosis, polioencephalomalacia, and frequent foot abscesses. In this case, undernutrition and absence of shelter exacerbated signs. Anecdotally several farmers reported higher than usual levels of pinkeye.

LIFESTYLE BLOCKS

Little to no disease was seen on these properties.

FEEDLOT

Mortality rates have remained constant and there has been minimal clinical disease since *M. bovis* introduction.

CHALLENGES

- Farmers have variable record-keeping and many farms have patchy or non-existent data on clinical disease.
- Inherent bias between farmers regarding perceptions of indicators of health and recall bias over
- Concerns around the disease control management programme and resulting personal impacts
- Movement restrictions caused many farmers to change their management practices, which is likely to have contributed to heightening disease severity and diminishing the animals' health status.

SUMMARY

In summary, the preliminary indication of the clinical impact of *M. bovis* is that disease in dairy farms has not been widespread, but where farms have shown clinical disease it has been severe. The dairy farms with severe clinical disease were large multi-platform milking properties with frequent mixing of animal between herds. Calf disease has been widespread but is difficult to interpret due to the comorbidities of other common calf diseases and the effect of movement control exacerbating signs. Drystock have shown very little disease.

Data is still being analysed and latest findings will be presented on management-related factors and any effect on production, mastitis and milk quality parameters.