

Similarity of Antimicrobial Susceptibility Profiles of Recent Isolates of *Mycoplasma bovis* Recovered from Various US Regions and Diverse Clinical Conditions

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Introduction

Mycoplasma bovis is involved in mastitis, pneumonia and polyarthritis of beef and dairy cattle. Infections can affect all ages and respond poorly to antimicrobial therapy. Variation in antimicrobial susceptibility profiles among isolates of *M. bovis* recovered from various tissues in dairy or beef outbreaks has been suspected but not verified. Increasing resistance of isolates has been recently documented,¹ so it appears that periodic large-scale surveillance would be useful to veterinarians, diagnosticians and researchers, especially to compare isolates from different regions within the US. It would also be beneficial to establish a standardized method for *in-vitro* susceptibility testing. This report contains antimicrobial susceptibilities for 223 isolates obtained from five US regions and from four tissue sites.

Materials and Methods

Isolates of *M. bovis* were obtained from 26 US states as low passage cultures from recent case submissions, together with a report of tissue of origin. Batches of each isolate were prepared in PPLO Broth (REMEL, Lenexa, KS) supplemented with 5% Alamar Blue (Biosource, Camarillo, CA) and frozen in aliquots at -70°C. After titration, antimicrobial sensitivity for the isolate was run on "Sensititer" plates (Trek Lab, Westlake OH) in 200 µl final volume using PPLO Broth with 5% Alamar Blue as redox indicator. Antimicrobials in doubling dilutions were dried onto single well series so that several concentrations were tested. *M. bovis* was added in the amount of 2 x 10³ to 2 x 10⁵ color changing units/well. Plates were read for color change (blue to red) at 48 hrs. For each antimicrobial, range of results, mode, MIC50 and MIC90 values were obtained globally, as well as by region and tissue site.

Results

There was remarkable similarity in antimicrobial activity patterns among the 233 isolates obtained from milk, respiratory tissue, joint fluid, or ear and eye. Likewise, similarity of antimicrobial activity patterns among strains from various U.S. regions was noted. Although the global MIC50 for oxytetracycline and chlortetracycline (2 and 4 µg/ml, respectively) indicated that these antimicrobials are quite active *in-vitro*, MIC90 values for the drugs (16 µg/ml for both) showed that more refractive isolates do exist. Enrofloxacin, florfenicol and spectinomycin (MIC90 of 0.5, 4, and 4 µg/ml, respectively) were found to be active compounds *in-vitro*. In contrast, erythromycin, tilmicosin and ceftiofur (MIC50 of 32, >64, and >64 µg/ml, respectively) showed limited *in-vitro* activity against the 233 isolates tested.

Significance

Florfenicol, fluoroquinolones and spectinomycin continue to show low MIC's against the recent US isolates evaluated in this study. In contrast, recent reports from the UK and Belgium show that their isolates are only sensitive to some of the fluoroquinolones, are uniformly resistant to the tetracyclines, and are often resistant to florfenicol and spectinomycin, according to interpretive criteria utilized by these authors.^{1,2}

References

1. Ayling RD, Baker SE, Peek ML, Simon AJ, Nicholas RAJ: *Vet Rec* 146: 745-747, 2000.
2. Thomas A, Nicolas C, Dizier I, Mainil J, Linden A: *Vet Rec* 153: 428-431, 2003.

Table 1. Antimicrobial activity against 233 isolates of *Mycoplasma bovis*.

	Range*	Mode**	Median & MIC50***	MIC90****
Chlortetracycline	0.25 to >32	4	4	16
Enrofloxacin	0.03 to 4	0.215	0.25	0.5
Erythromycin	4 to >32	32	32	>32
Florfenicol	0.06 to 8	1	1	4
Oxytetracycline	0.125 to >32	2	2	16
Spectinomycin	1 to >16	2	2	4
Tilmicosin	0.5 to >128	64	64	>128
Ampicillin	>32	>32	>32	>32
Ceftiofur	64 to >64	>64	>64	>64

* Range of results for 223 isolates

** Mode – the most frequent result

*** Median and MIC50- the central result – 50% of the isolates with MIC below and 50% above the value

****MIC 90 – 90% of the isolates with MIC below the value. All values are expressed as µg/ml.

Neospora caninum Seroprevalence in Iowa Feedlots and its Association with Morbidity, Mortality, Production Parameters and Carcass Traits

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Introduction

Since first recognized in 1984 and described as a cause of bovine abortion in 1989, *N. caninum* has emerged as a leading cause of abortion in cattle worldwide. Traditionally, the economic impact of *Neospora* infection on beef productivity has been thought to be limited to the costs of abortion and increased culling. However, recent studies of Texas-based feedlot cattle described an association between the presence of *N. caninum* antibodies and reduced average daily gain, live body weight and hot carcass weight at slaughter. Seropositive feedlot steers, while exhibiting similar morbidity and mortality rates as seronegative steers, also demonstrated higher treatment costs if sick compared to seronegative sick calves. The purpose of this study was to test the null hypothesis that *N. caninum* serop-

ositive Iowa feedlot cattle had similar morbidity rates, mortality rates, treatment costs, production parameters and carcass traits compared to seronegative cohorts. We also examined the hypothesis that the occurrence of chronic disease was equal between *Neospora caninum* serologically positive and negative animals.

Materials and Methods

This prospective cohort observational study was conducted in two western Iowa commercial feedlots in fall 2002. Six hundred sixty-seven animals from 31 consigners were enrolled over five separate days. The cattle were spring and summer-born calves from Iowa. All had been previously vaccinated for respiratory and *Clostridial sp.* pathogens. Blood samples were collected at processing.