

Symptom progression and serological dynamics following introduction of a low-virulence *Mycoplasma ovipneumoniae* strain in a desert bighorn herd

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ABSTRACT: *Mycoplasma ovipneumoniae* was detected in the Zion desert bighorn sheep herd in July of 2018 following observation of respiratory symptoms by Zion National Park staff and visitors. The herd had been tested through routine sampling in 2017 and showed no serological or PCR evidence of *M. ovipneumoniae*, providing strong evidence that this was a novel introduction event. The ensuing *M. ovipneumoniae* event produced symptoms similar to those reported during other introductions of *M. ovipneumoniae* into bighorn sheep herds, but without any documented mortality. Thus, the Zion herd provides us a unique opportunity to closely observe disease progression in a desert bighorn system after an apparently low-virulence pathogen introduction event. Animal testing in the 18 months following introduction indicated that *M. ovipneumoniae* continued to circulate in the Zion population, and mild symptoms were observed with some regularity. However, intensive monitoring throughout 2019 revealed a symptom progression in lambs that was substantially delayed from patterns reported in other systems. Additionally, serological patterns deviated from those of other well-studied bighorn populations, with animals producing lower percent inhibition values than is typically observed in infected herds. Taken together, these observations suggest that low-virulence *M. ovipneumoniae* events may exhibit fundamentally different dynamics, requiring a prolonged follow-up monitoring structure compared to that typically required for higher-virulence events. More generally, this work underscores the utility of collecting directly comparable data on disease progressions across a variety of bighorn herds.

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KEY WORDS: *Mycoplasma ovipneumoniae*, strain virulence, disease severity, desert bighorn sheep, serology, Zion bighorn herd
