

***Pasteurella/Mannheimia/Bibersteinia* Culture and Strain Typing (Serotyping, Biotyping, Genotyping)**

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Abstract: Bacteria in the family Pasteurellaceae, e. g. *Pasteurella multocida*, *Mannheimia* spp. and *Bibersteinia trehalosi* are some of the most often-encountered organisms in ruminant nose, pharynx and lungs. They are often considered primary or opportunistic respiratory pathogens capable of causing pneumonia in cattle, wild and domestic sheep, and other ruminants. Culture, strain typing and taxonomy of these organisms to determine pathogenicity and transmission among and between species have been the object of a multitude of approaches. Culture results depend upon the types of growth media employed, the culture conditions, and the familiarity of the technologists performing the culture. Perhaps more important are the ways in which the samples are collected, handled and shipped, as these organisms are rather fragile and do not survive long outside of a living host.

Previously, strains in the genera *Mannheimia* (formerly *Pasteurella*) and *Bibersteinia* (formerly *P. trehalosi* or *P. Type T*) have been identified with serological typing developed using isolates from domestic ruminants. While serology is not always clear with all isolates from domestic animals, it has been widely used. Serology has also been coupled with biochemical tests to determine species and biotypes. Unfortunately, these techniques much less successful with Pasteurellaceae isolated from wild ruminants, such as bighorn sheep. Additional biochemical profiles (biovariants) have been developed to better differentiate the wildlife strains.

Newer DNA-based technology can also be employed in many different ways to genotype strains. Some of these attempt to analyze the entire genome (chromosome, plasmid), and others target specific genes, or parts of genes, mostly using polymerase chain reaction (PCR). Direct sequencing of PCR products is also commonly used, especially in determining bacterial species present from either culture or non-culture based techniques.

All of the various approaches have both strengths and weaknesses. In most instances the most effective protocol will utilize several approaches, beginning with the quickest and cheapest (such as biochemical profiling) and progressing through the more complicated and expensive ones. The extent to which strains are scrutinized will depend upon their importance, time and labor availability, and budgets.

Biennial Symposium of the Northern Wild Sheep and Goat Council 17:67; 2010

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