



# RESEARCH FACTS

RESEARCH & TECHNOLOGY DEVELOPMENT FOR THE CANADIAN BEEF INDUSTRY

## IN PROGRESS

### Microbiome of foot lesions in beef cattle

#### Project Title:

Investigating footrot and its microbiological relation to digital dermatitis

#### Researchers:

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#### Project Code:

ANH.12.20

#### Completed:

*In Progress. Results expected in December 2023.*

#### Background

Footrot is the second leading reason for injectable antibiotic use in feedlots. Footrot doesn't just occur in poor pen conditions and poorly managed feedlots. A footrot vaccine is commercially available, but it only targets one bacterium and doesn't work too well. There may be more bacteria involved in footrot than the single bacterium the vaccine is based on. These researchers also think that some of the bacteria that are involved in digital dermatitis (also known as hairy heel wart, strawberry foot rot, raspberry heel, or foot wart) may also be involved in footrot. This could confuse the diagnosis and explain why some "footrot" cases may not respond to treatment.

#### Objectives

- Identify the presence and proportions of known anaerobic bacterial species (anaerobic microbiome) with anaerobic culture and 16S sequencing of all bacteria, from samples from cattle with foot rot, digital dermatitis or both, as well as determine antimicrobial resistance patterns,
- Describe differences in identified bacterial species between sampling strategies (skin biopsy, swab, subcutaneous tissue sampling), and
- Describe clinical characterization of cattle afflicted by foot rot, solely as well as in combination with digital dermatitis, while capturing risk factors for both diseases, and link this to laboratory diagnosis.

#### What they will do

In each of two years the team will identify 4-6 feedlots and enroll 80 cattle; 20 that have footrot but not digital dermatitis, 20 that have digital dermatitis but not footrot, 20 where it may be either, and 20 unaffected cattle. They will sample affected cattle (and healthy penmates) and record information about breed, days on feed, leg cleanliness, along with pen conditions and recent precipitation records. Then they will identify the bacteria that are present in the feet. They'll also look at antibiotic resistance, as well as metagenomics to look at the microbial profiles in the footrot, digital dermatitis and unaffected feet, skin surface, skin tissue, and tissue underlying the skin. They will also do histology on the skin and biopsy samples.

## **Implications**

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This will help get a better sense of the disease process, the organisms that cause it, potential treatment strategies and vaccine candidates.

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