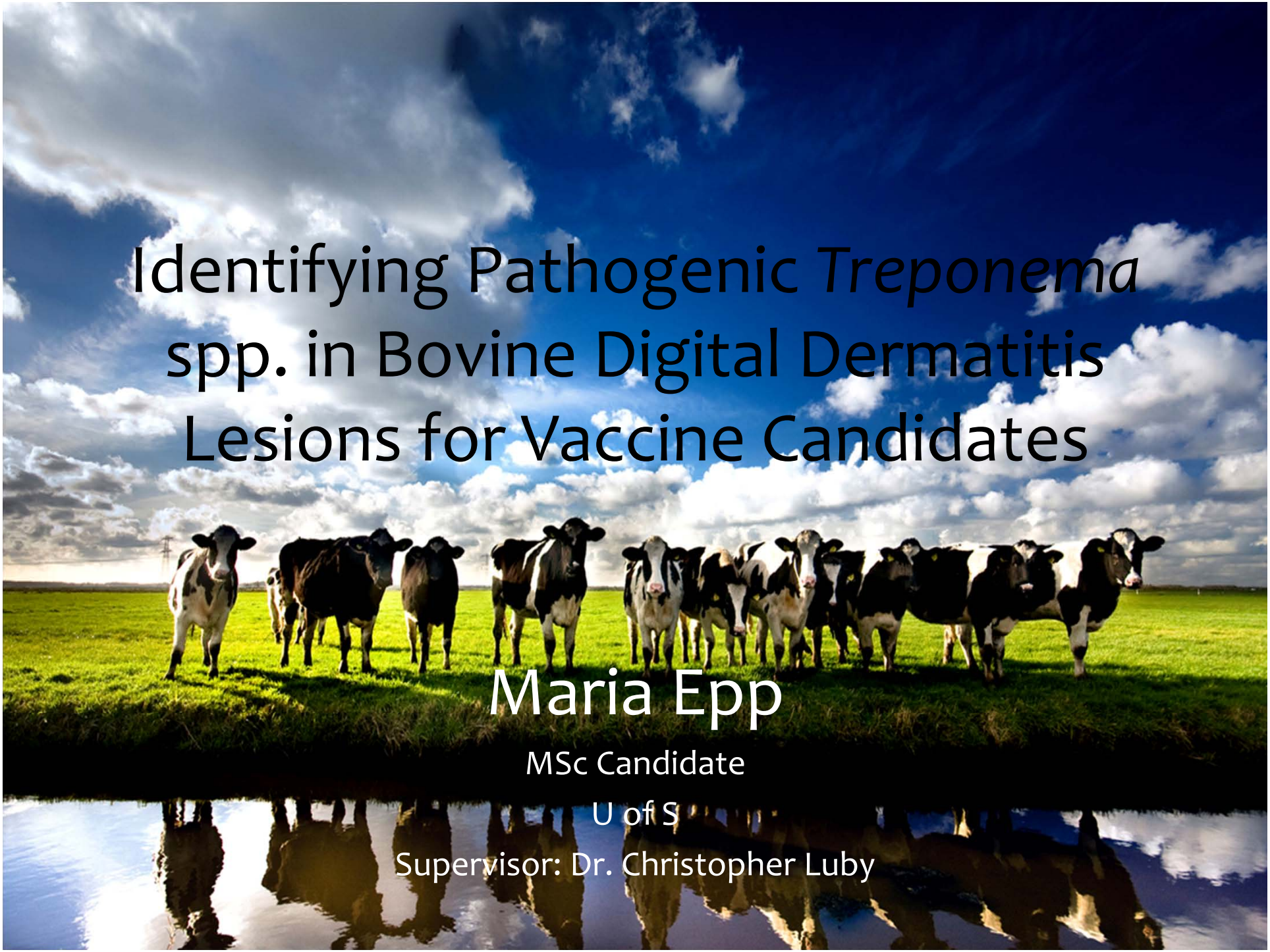

# Identifying Pathogenic *Treponema* spp. in Bovine Digital Dermatitis Lesions for Vaccine Candidates


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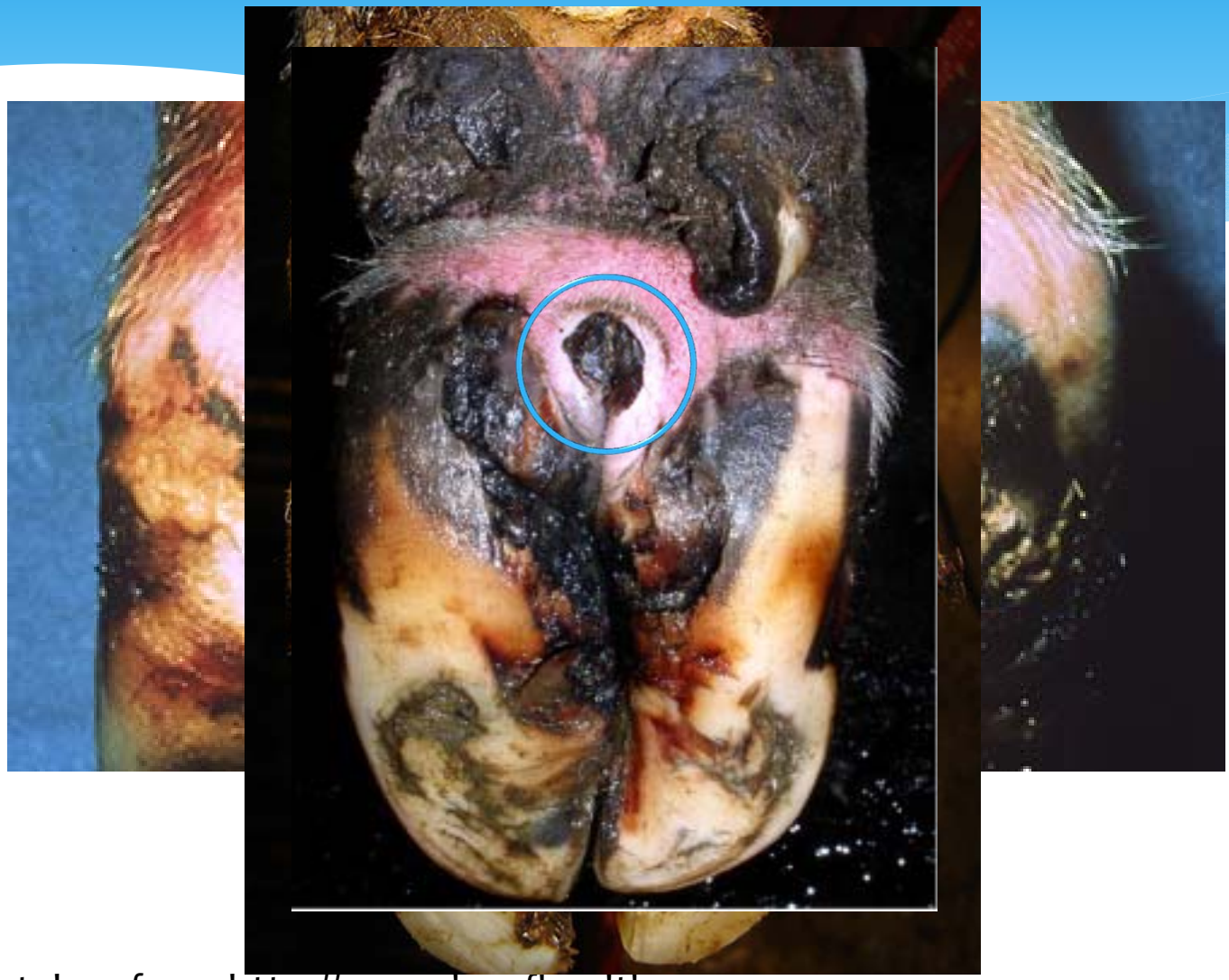
# Bovine Digital Dermatitis



Pictures taken from http://www.hoofhealth.ca

# Background Information

* Cheli and Mortellaro (1974) first described DD at the 8th International Conference on Diseases of Cattle in Italy

* Walker et al. (1995) reported the first spirochete cultures from DD

# *Treponema* spp.

* Gram-negative spirochetes (5-20µm long, 0.1-0.4µm diameter)
* Strictly anaerobic
* Require serum and volatile fatty acids
* Ferment fructose, mannitol, pectin, mannose, ribose, maltose, and glucose

# Suspected Target Species

* *T. phagedenis*-like
* *T. denticola/T. pedis*-like
* *T. vincentii/T. medium*-like

Stamm et al. (2002), Evans et al. (2008), Evans et al. (2011), Sullivan et al. (2013), Scholey et al. (2013),

# Prevalence

* Average across BC, AB, and ON: **40%** of all foot lesions were DD (Alberta Dairy Hoof Health Project, 2012)
* **97%** of AB dairy farms have at least 1 case of DD (WCDS Advances in Dairy Tech., 2014)
* **2-83%** of cows affected on AB dairies (WCDS Advances in Dairy Tech., 2014)
* **84%** of SK producers identified DD on their farms (unpublished data by SaskMilk, 2013)
* **59%** of SK producers stated DD had significant negative financial effects (unpublished data by SaskMilk, 2013)

# Research Objectives

1. Determine *Treponema* species isolated from DD lesions from dairy and feedlot cattle

2. Determine antigens common to the isolated *Treponema* species for vaccine development

3. Determine whether dairy and feedlot DD is the same

# Research Methods

1. Sample
   * 40-60 Holstein DD lesions (5-10 herds)
   * 5-10 samples/feedlot from slaughtered animals (10 feedlots)
2. Culture affected cows
3. Identify species and their location
4. Identify vaccine targets common to all species
5. Screen vaccine targets for immune responses

# Challenges

* Currently developing method to reliably grow *Treponema* spp from heel warts

* Selectively culturing and isolating *Treponema* spp.
  * Must create a strict anaerobic growing environment
  * Other species may dominate the culture medium

* Determining species responsible for DD lesions
  * Likely that multiple species are working together


Questions?