

Project Title: A pilot study on Vibriosis and Trichomoniasis in Tasmanian Cattle Herds

Project Duration: Start Date: 1 September 2014 Finish Date: 31 March 2017

Project Outline

Background:

Vibriosis is a venereal disease of cattle caused by a bacterium called *Campylobacter fetus subsp. Venerealis*. Mature bulls (over 4 yo) are the major reservoir of infection and infect females at mating, resulting in early pregnancy loss and also some later abortions. Infected females can also transmit the disease back to males. Many females develop some resistance after initial exposure and maintain subsequent pregnancies, so the poorest pregnancy rates are usually seen in maiden heifers. Herds where the disease has been established for some time do not usually have spectacularly low pregnancy rates.

Trichomoniasis (“Trichs”) is caused by a single-celled protozoal organism called *Tritrichomonas foetus*. Clinically the disease is very similar to Vibriosis, causing early pregnancy loss and also some later abortions. Mature bulls are carriers. There is no vaccine and eradication is more difficult but is achievable with reasonable management skills.

History

Vibriosis was a major problem in Tasmania about the middle of last century and a cattle reproduction unit was set up by the then Department of Agriculture. Dairy farmers formed area control groups and artificial insemination was promoted and used heavily to overcome the problem in the dairy industry. A number of beef herds were also diagnosed about this time and the disease was eradicated in those herds by vaccinating bulls and culling empty cows at pregnancy diagnosis. The cattle reproduction unit was dissolved in the 1980’s, but Vibriosis had not been systematically eradicated by that time.

Up until the mid to late 1990’s Tasmania had a quarantine policy for all introduced cattle, and mature bulls were tested three times for subclinical *Campylobacter fetus* and *Tritrichomonas* infection while in quarantine. Some *Campylobacter* infected animals were found, and were vaccinated to prevent the introduction of Vibriosis (*Campylobacter fetus subsp venerealis*) to Tasmanian herds. Vibriosis is common on the mainland and many bulls enter Tasmania now with no testing or certification in regard to Vibriosis and Trichomoniasis.

Diagnosis

Both the *Campylobacter fetus* and *Tritrichomonas* organisms are delicate and don’t live long outside the bull or cow. This is good for disease control, but makes diagnosis difficult as samples must be transported to the laboratory within 6 hours of collection if the organism is to be cultured successfully. More sophisticated tests such as the PCR are also affected by transport delays.

Live animal export issues

Many live animal and reproductive material international export protocols require certification that the herd of origin is free of *Campylobacter fetus* and *Tritrichomonas fetus*.

Objectives

1. Implement *Tritrichomonas fetus* PCR at Animal Health Laboratory
2. To determine whether *Campylobacter fetus* and *Tritrichomonas fetus* are common causes of infertility in Tasmanian cattle herds.
3. To determine whether the *Campylobacter fetus* ELISA vaginal mucous test has acceptable false positive and false negative rates in Tasmanian cattle herds.
4. To conduct an awareness campaign amongst rural veterinarians and cattle producers in regard to *Campylobacter fetus* and *Tritrichomonas fetus* if significant numbers of isolations are made.

Method

Sample submission

This *Campylobacter fetus* and *Tritrichomonas fetus* survey was publicized to all Tasmanian registered veterinarians through the Animal Health Quarterly Newsletter (published by Biosecurity Tasmania). Veterinarians were encouraged to recruit cattle herds with pregnancy testing rates of less than 90%. The cost of *Campylobacter fetus* and *Tritrichomonas fetus* testing on bulls was subsidized. Producers were made aware, prior to testing that a diagnosis of *Campylobacter* or *Trichomoniasis* can also prevent producers from exporting heifers to certain export markets.

A Labfact information sheet was published by the Animal Health Laboratory clearly explaining the protocol (including Tricamper collection device) and transport media (provided by Animal Health Laboratory) required for *Campylobacter fetus* and *Tritrichomonas fetus* testing in bulls. Tricamper collection devices for prepuccial samples and transport media were provided to veterinarians by the Animal Health Laboratory

In addition, reproductive tracts from infertile, not detected pregnant (NDP) heifers and cows were collected from abattoirs. The tracts were submitted to the Animal Health Laboratory within 1-3 hours of slaughter at the abattoir and samples were taken for *Campylobacter fetus* and *Tritrichomonas fetus* culture.

Bacterial culture

Campylobacter fetus

The prepuccial washes in phosphate buffered saline or uterine mucous (from reproductive tract) were inoculated on *Campylobacter* selective *Campylobacter* medium (Skirrow's medium) and blood agar in microaerophilic conditions. Positive cultures were confirmed by PCR and PCR products by agarose gel electrophoresis, as per ANZSDP, Bovine genital campylobacteriosis.

Tritrichomonas fetus

The prepuccial washes in phosphate buffered saline or uterine swabs (from reproductive tract) were examined under a microscope (using dark field) and if *Tritrichomonas*-like protozoa were seen the sample tested by qPCR (Taqman) (ANZSDP Bovine *Tritrichomonas*)

The results of submissions of bovine aborted fetuses, submitted to the Animal Health Laboratory, January 2014 to June 2017 were also included in this survey.

RESULTS:

A total of 5 properties had bulls (up to 5-6 bulls, all > 4 years old) tested for subclinical *Campylobacter fetus* and *Tritrichomonas fetus* infection under the program. All bulls were negative.

One property on Flinders Island had 15 NDP heifers and cows sent to an abattoir. A *Tritrichomonas* like organism was found in mucous samples but confirmation by PCR was not possible at the time.

From January 2014 to June 2017 there were 7 properties where abortions were due to *Campylobacter fetus*. A direct PCR for *C. fetus* subsp. *venerealis* was implemented at the AHL in late 2015 and the two submissions in 2016 were confirmed as *C fetus* subsp. *venerealis* using this PCR. There were no abortions diagnosed due to *Campylobacter fetus* subsp *venerealis* or *Tritrichomonas fetus* in 2017.

A final year veterinary student reviewed the scientific literature on *Campylobacter* and *Tritrichomonas* and produced summaries of diagnostic testing options.

Since 2000 there were 11 confirmed cases of *Campylobacteriosis* and 1 confirmed and 1 suspicious case of *Trichomoniasis* as causes of infertility or abortions in Tasmanian cattle (based on Animal Health Laboratory records, LIMS). This low number of confirmed cases of *Campylobacter* is consistent with the low rate of diagnosis of causes of abortion and infertility. From 39 investigations into abortions or infertility from January 2015 to June 2017, in only 11 cases was the diagnosis confirmed. The majority were due to *Campylobacter fetus*, 3 due to bovine pestiviral infection and one due to neosporosis.

Based on the findings from this survey, *Campylobacteriosis* is the more common cause of abortion / infertility in Tasmanian beef herds. This study demonstrates that the more effective method of diagnosing infectious causes of abortion in Tasmania is by submission of whole fresh calves for necropsy. Tasmania is different to mainland states in that the ambient temperature often favours preservation of the aborted foetus for laboratory testing.

Dr Bruce Jackson and Kayla Jackson, veterinary student from University of Sydney, presented these results in an oral presentation at Mt Pleasant Laboratories.

Because the project coordinator was involved for significant periods of time in the Myrtle rust eradication program it was not possible to coordinate collection of samples for the *Campylobacter* ELISA assay and compare the results to uterine culture and post culture PCR.

An article in a newsletter sent out to veterinarians encouraged veterinarians to consider these two diseases when dealing with sub-fertility cases in cattle herds, and an article for farmers has also been written for distribution.

See appendices 1, 2 and 3.

Outcomes

1. Campylobacteriosis (*Vibrio*) was confirmed to be a relatively common cause of infertility in Tasmanian cattle herds, and *Trichomonas* infection, while not as common, is still present.

Recommendations

1. Awareness articles continue to be produced for cattle producers and rural veterinarians to consider Campylobacteriosis (*Vibrio*) and *Trichomonas* when subfertility / infertility are present or abortions occur.
2. Herd bull vendors should vaccinate sale bulls twice with Vibrovax® at an interval of at least 4 weeks.