

Recommendations for control and prevention of Campylobacter and Tritrichomonas

The bovine venereal diseases, campylobacteriosis (caused by *Campylobacter fetus venerealis* (CFV) and trichomoniasis (caused by *Tritrichomonas foetus* (T foetus), remain endemic in northern Australian states and are present within southern Australian cattle herds, causing mild to severe reproductive losses. Prevention and control of these sexually transmitted diseases, through a better understanding of current prevalence rates and regular testing of breeding bulls has the potential to allow for long term increases in the number of cattle produced and more efficient breeding herds, leading to huge economic benefits within the Tasmanian cattle industry.

Prevalence Data

Current prevalence rates for these two diseases within Tasmania are unknown, although current evidence from confirmed cases submitted into testing at the Animal Health Laboratory (AHL) in Launceston, suggests that CFV is present within Tasmanian beef and dairy herds, and that sporadic cases of trichomoniasis occur as well. Over the last 17 years a total of 11 confirmed cases of Campylobacteriosis and 1 confirmed and 1 suspicious case of trichomoniasis have been documented from AHL.

A pilot study run by the Department of Primary Industries, Park, Water and Environment was initiated in 2015, to encourage producers and veterinarians to send in samples of vaginal mucous from empty cows or heifers, preputial scrapings of mature bulls or the full reproductive tract of males or females. Unfortunately, this opportunity was not taken up by many producers, and so is inadequate for demonstrating current prevalence. Currently any prevalence data relies upon the producer and/or their veterinarian submitting samples in for testing, which evidence suggests is not occurring on a regular basis and without this it is difficult to determine the effect these two venereal diseases are having on the Tasmanian cattle herd.

Surveillance

Routine systematic testing of bulls for CFV and *T foetus* can allow for early detection of a disease incursion and is vital for herds in endemic regions (Ondrak 2016). It is up to producers and their veterinarians to pursue diagnostic testing for their herd, which is recommended for any breeding herd with a pregnancy rate less than 90%. The conduction of sample collection should take place 1-2 months after the end of breeding season and prior to the next, this allows for the number of organisms to increase, and improve the likelihood of detecting a positive CFV and/or *T foetus* bull (BonDurant 2005).

Experiments have indicated a significant improvement in detecting both CFV and *T foetus* using PCR directly on preputial washes, compared with that of conventional culture, however conventional PCR techniques for routine diagnostic testing is not ideal. The recent development of real-time PCR for both organisms allows for detection directly from diagnostic specimens and would be most suitable for routine surveillance within Tasmanian natural breeding herds.

For large breeding herd, initial testing of all breeding bulls may prove very costly, for these instances, the pooling of samples (2-10) may be used without significant reduction in ability to detect positive herds. If positives are identified, the producer may then choose to perform testing on the bulls from the positive pool in order to determine which bulls should be culled (Ondrak 2016).

Awareness

Currently, few producers and veterinarians are testing for campylobacter or tritrichomonas, despite the fact they have both been identified within the Tasmania beef population. This may be due to the perceived low prevalence, due to the lack of current data. As both are present, it is necessary to increase awareness amongst cattle producers and rural veterinarians so that appropriate testing can be instituted where necessary and so that sound preventative measures can also be adopted by the industry.

This may be achieved through industry newsletters and media releases focusing on Tasmanian beef and dairy producers. Large animal veterinarians can also be instrumental in informing their clients, and should be advised of the possibility of these organisms affecting their client's cattle. Members of the Tasmanian Cattle Health Task Force, including the Livestock Biosecurity Network, the Tasmanian Farmers and Graziers Association and the Tasmanian Institute of Agriculture, can be utilized in order to further awareness within producers and hopefully assist in the gradual eradication and then prevention of both venereal diseases.

Artificial Insemination (AI)

With proper hygiene, artificial breeding can be used to prevent the spread of both organisms, and has been successful in dairy herds and small farm beef herds. Inadequate management of AI, without rigorous sanitary control can be responsible for the transmission of both pathogens (de Oliveira et al. 2015). The failure to change gloves while performing vaginal exams has been reported to allow for the spread of these organisms from one female to another (BonDurant 2005). Alternatively, semen can become contaminated with either parasite or bacterium at some stage during the collection process and by that means may be transmitted to the female. This can be avoided by ensuring the semen collection and storage process follows strict protocol.

By following protocol and ensuring adequate hygiene, artificial insemination can be utilized to prevent the spread of these two diseases. Unfortunately it may be impractical for many extensively managed beef properties (Hoffer 1981). Therefore strict adherence to prevention and control strategies, in particular vaccination and the management of non-productive females and non-virgin bulls is key to effective control of both diseases. (Ondrak 2016).

Vaccination

Campylobacteriosis can be controlled with regular vaccination of breeding bulls (Walker 2005). A commercial vaccine is available through Pfizer in Australia, that consists of two injections given 4-6 weeks apart, followed by an annual booster (Zoetis n.d.). The vaccine renders animals highly resistant to infection with CFV and the producer recommends commencing vaccination 4 weeks prior to joining (Hum 2004).



1: Zoetis (n.d.)

In herds with confirmed infection, annual vaccination of replacement heifers and all bulls is recommended, with the addition vaccination of cows if severely affected. Once infection is under control, annual bull vaccinations should be continued, though the vaccination of females can cease (State of Queensland 2016). There is some evidence suggesting that the immunization of infected bulls with an appropriately adjuvanted antigen can clear Campylobacteriosis, or at least sufficiently

reduce the number of CFV organisms limiting the bull's ability to transmit an infectious dose to susceptible females (BonDurant 2005). Vaccination of a herd can assist with the reduction of organisms present on the property, and the prevention via stimulating an immune response within vaccinated animals.

There have been several studies where the systemic immunization of bulls with *T foetus* antigen has prevented or cleared genital infections, however there is no commercial vaccine available for use in Australia (Michi et al. 2016; Walker and McKinnon 2011). Overseas, there are several commercial vaccines, marketed for helping to reduce the shedding of *T foetus* organisms to reduce the spread of the infection throughout the herd. The vaccine can also be purchased as a combination against CFV and 5-way leptospirosis (Boehringer Ingelheim n.d.). As these are not available, it is necessary to eradicate and control against Trichomoniasis via the culling of infected bulls, the culling or resting of infected females and the use of only virgin or disease-free bulls for breeding (Walker 2005).

Herd Management

In most herds, the best strategy for control is the culling of infected bulls and sexual rest or culling of infected females. In large herds, this may prove too costly to replace all breeding bulls and it may be necessary to adopt a two-herd system; splitting the herd into separate mating groups with virgin bulls only for one group. The gradual replacement of older or infected bulls with virgin or bulls less than 3 years of age, should take place to reduce the risk of disease transmission (BonDurant 2005). Any new bulls brought into the breeding herd should be virgin, vaccinated and/or tested and cleared of both diseases (with repeated culture and/or PCR).

Pregnancy testing at 2 and 6 months after the bulls are removed is highly recommended, with the culling of all empty cows under high suspicion of infection with either CFV or *T foetus*. Any cows that present with vaginal discharge, or have aborted should be individually investigated for the presence of disease (Walker and McKinnon 2011). This will allow for the removal of any carrier females and prevent the spread to any of the breeding bulls.

References

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