

## Vibriosis (Campylobacteriosis) in the Northern Territory

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### INTRODUCTION

Vibriosis (Campylobacteriosis) is caused by the bacterium *Campylobacter fetus* subsp. *venerealis*. It is a venereal disease of cattle transmitted during mating and also at artificial insemination, if strict precautions are not taken. The bacterium is a particularly persistent organism that localises in the reproductive tract of cows. In bulls, it may be present indefinitely in the prepuce, penis and in semen, unless treated. It will not survive outside the animal. Cows infected at mating are likely to become infertile or may abort. Vibriosis is a major cause of infertility in cattle herds. This is reflected in poor conception rates, sometimes below 50%. There are increased numbers of cows returning to service, resulting in reduced calving rates and delayed conception patterns (more calves are born later and hence have lower average weaning rates).



### DISTRIBUTION IN THE NORTHERN TERRITORY (NT)

Vibriosis is widespread in the NT and has been found in every region. It has been recorded in 88% of herds in the Victoria River District and there is evidence to suggest that it is present both in the Barkly Tableland and the Gulf districts. The prevalence of vibriosis in the Alice Springs district is possibly higher than was previously thought.

## **MODE OF INFECTION AND SPREAD**

Vibriosis is a sexually transmitted disease and all sexually active animals are susceptible to infection, unless they are already immune. Vibriosis is not thought to spread from one female to another. However, it is possible for it to spread between bulls running together; bulls which have never been used for natural service have been shown to carry the organism.

The most common way in which a herd can become infected is through the introduction of infected bulls or cows. Once present in a herd, vibriosis is spread to susceptible animals at mating.

When a cow is infected, the organism passes through the cervix and establishes in the uterus. This leads to inflammation of the lining of the uterus (endometritis) and of the fallopian tubes or oviducts (salpingitis). It is not until this inflammation subsides that further conceptions can occur, by which time the organism has been expelled from the reproductive organs. It is possible, however, that the organism may persist for some months in the vagina.

## **SIGNS AND SYMPTOMS**

There are no obvious symptoms in bulls. If a cow is infected at mating, she is unlikely to sustain a pregnancy due to the early death of the embryo. The infection that occurs due to the presence of the bacteria can prevent fertilisation from occurring or may cause early abortion. Over 10% of infected females become permanently infertile due to fallopian tube obstruction, resulting in fat, barren cows. In herds with endemic infection, the main impact on conception rate is most evident in maiden heifers as they are susceptible. Animals that have overcome infection usually develop a sound immunity.

Although difficult to detect in the paddock, the most common signs of vibriosis are cows returning to service to the bull and the presence of aborted fetuses of between three to seven months of age. Some cows will eventually recover from the infection and get into calf. This results in a delayed conception pattern and a prolonged calving period, which may cause management problems. An increased percentage of 'second round' calves, that are weak and or premature, is common in herds affected by vibriosis.

## **DIAGNOSIS**

Identifying vibriosis is difficult because of the absence of clinical signs. The disease is insidious and can often remain unrecognised in herds, causing ongoing production losses.

Confirmation of the disease can be obtained in two ways.

- a) Testing vaginal mucus from cows and heifers that have been exposed to infected bulls. The test detects antibodies to the vibrio organism. The test should be done on a representative sample of both empty and pregnant cows and heifers from a herd.
- b) Testing preputial washings from at least 10, preferably from all, the bulls in a herd. Samples can be collected when bulls are tested for semen. Positive results from any bull should be considered as evidence of herd infection.

A blood test is also available, but is not very reliable. It is of value to determine whether infection is present in a herd; however, it is not accurate on an individual basis. Care must be taken before declaring a herd free of vibriosis based on the results of such tests as none of these diagnostic methods is 100% reliable.

## **CONTROL**

In the Top End of the NT, the most effective way to control vibriosis is through a planned pregnancy testing and vaccination program. Removal of all empty dry cows from a herd at first round weaning musters should greatly reduce the level of herd infection; however this may not be appropriate for the arid zone. At second round

musters, many of the empty dry cows will have had their calf weaned at the first round but have not re-conceived yet as they require a couple of months on green feed for their condition to improve to resume cycling. It is possible to treat animals with antibiotics but this is considered neither economic nor practical.

Cows develop immunity by themselves three to six months after exposure and herd tolerance may occur naturally over two to three years. However, there is the possibility that some cows will remain carriers. The use of virgin vaccinated bulls on previously unmated vaccinated heifers is the preferred option.

As a bull ages, its lining of the sheath develops folds, which can effectively harbour the vibrio organism. As older bulls are more likely to harbour the organism and carry it between cows, they should be culled when they are over eight years old.

## VACCINATION

The prevention of the disease by strategic vaccination is the cheapest and most effective way of controlling vibriosis.

There are five possible vaccination options:

1. Do not vaccinate
2. Vaccinate all bulls
3. Vaccinate all heifers
4. Vaccinate all bulls and heifers
5. Vaccinate all bulls, heifers and cows.

In the past, the preferred program has been to vaccinate bulls only; many producers still choose to do this. However, with the increasing value of cattle, producers should now consider vaccinating both heifers and bulls. A bivalent vaccine is recommended for use in all animals at least four weeks prior to joining.

Vaccination programs must be ongoing to be effective because animals will lose immunity. Bull control is also critical to the success of the vaccination program.

It is recommended that initially two 5 mL doses be given four to six weeks apart. Where this is not possible, the second dose should be given at the next earliest possible opportunity, for example at the second round of mustering, or the first round of mustering the following year. When heifers are more than 18 months old, they only require one initial vaccination. Most heifers in the NT are mated for the first time at more than 18 months old, so one vaccination prior to mating is adequate; a further vaccination the following year is recommended.

Under commercial conditions in the NT, it is not economically viable to vaccinate the whole herd annually. However, vaccinating maiden heifers and bulls, or bulls only may be economic. All new bulls introduced to the property should be vaccinated twice, four to six weeks apart.

It should be stressed that where two vaccinations are required, full immunity will only develop after the second vaccination. Females more than 18 months old only require one dose followed by a booster dose annually. Bulls only require one booster dose annually after the initial two doses.

In many instances (where bull control is good) **vaccinating and treating only the bulls** can break the transmission cycle, with the disease gradually dying out in the herd. For this reason **preventive vaccination of bulls** should be adopted as a routine practice.

In a pastoral industry survey conducted in the NT in 2004, it was found that 48% of producers vaccinate against vibriosis in the Katherine Region. Ninety percent of these vaccinate annually, with 10% vaccinating less frequently. Bulls were most commonly vaccinated, as 69% of properties did so. One station vaccinated both

heifers and bulls; only heifers were vaccinated on 28% of the stations surveyed. It was also recorded that 42% of properties in the Barkly and only 24% of properties in the Top End vaccinate against vibriosis.

Research on one NT commercial cattle station found an 11% increase in pregnancy rates in maiden heifers vaccinated once against vibriosis prior to joining.

## **Bulls**

Initially, bulls require two 5 mL doses, four to six weeks apart with an annual 5 mL booster shot. New bulls to the property should also receive the two initial 5 mL doses. Two vaccinations will also clear the disease from most but not all infected bulls.

## **Cows and heifers more than 18 months old**

A single 5ml dose before joining will provide protection, followed by a 2 mL booster annually or every two years.

## **Heifers less than 18 months old**

They require two 5 mL doses four to six weeks apart and then a 2 mL booster annually or every two years.

## **WARNING**

Vaccination programs must be ongoing to be effective, otherwise animals will lose immunity and become susceptible to infection. In susceptible herds vibriosis can cause a sudden, severe reduction in reproductive performance across the whole herd.

In a vibriosis-free herd, the introduction of the disease can cause a “crash” in the weaning rate. The primary focus must be to prevent the introduction of infected bulls as they have the potential to spread the disease throughout the herd. An infected bull will only infect unprotected cows with which it mates. However, if the problem is severe or bull control is difficult, then vaccination of the breeder herd is also recommended.

## **SUMMARY OF BEST PRACTICE**

- Use a bivalent vaccine in the vaccination program.
- All new bulls should be vaccinated twice, six weeks apart before coming into contact with females. Two vaccinations will clear the disease from most infected bulls. All bulls should be given an annual booster vaccination.
- Vaccinate all heifers prior to joining. If heifers are less than 18 months old at joining, they will require two doses four to six weeks apart. Older heifers only require one dose, although a follow-up dose the following year will be beneficial.
- Full immunity will only develop after the second vaccination if heifers are less than 18 months old.
- If a herd is free of vibriosis but the exclusion of infected bulls cannot be guaranteed, then vaccination of the whole herd should be considered.
- Bulls more than eight years old are likely to be carriers of vibriosis and should be culled.

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