

TRICHOMONOSIS IN A COMMERCIAL BEEF HERD: EPIDEMIOLOGICAL INVESTIGATION AND FINANCIAL IMPACT ASSESSMENT

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INTRODUCTION

Trichomonosis is a venereal disease of cattle caused by the protozoan *Tritrichomonas foetus* which causes significant economic losses in cattle herds. Economic losses are due to open cows, repeat breeding, subsequent longer calving intervals and veterinary expenses. Infection of a previously uninfected herd may occur with the introduction of an infected female, but usually occurs when non-virgin bulls are purchased or rented, or when cattle mix with neighbouring herds. Bulls become persistently and asymptotically infected, whilst in females the infection usually persists for about 3 months, causing embryonic and foetal losses. A cow that has recovered from the infection has a short-lived immunity and will still be susceptible to infection in subsequent years if an infected bull is used. Although most cows will get rid of the infection after about 3 months, some cows will remain infected for extended periods of time, and even throughout pregnancy. Diagnosis of Trichomonosis in a herd is done by collecting samples from the preputium (sheath) of bulls and submitting it for laboratory analysis. Unfortunately these tests are not 100% sensitive, meaning that false negative test results may occur. For this reason it is recommended to test bulls up to three times with at least 7 day intervals, especially during an outbreak or for certification. Due to these factors the control of the disease is a challenge to the veterinarian and farmer, and a strong relationship of trust is needed for a successful outcome.

CASE HISTORY

A small, growing commercial beef herd in the Free State (n=84) experienced a decrease in calving rate in 2010 and called for veterinary help. Multisire, year-round breeding was practised in the herd. Several purchases were made of female as well as male animals in the preceding years. A number of bulls were purchased without Veterinary Certificates for Breeding Soundness. Because of the relative inexperience of the owner, confusion existed with regards to the difference between pedigree certificates, and Veterinary Breeding Soundness Certificates. Herd bulls were tested in 2010 and 4 out of 5 were found to be positive for Trichomonosis. One of the positive bulls (older bull) was sold, while the negative bull was separated from the herd and moved to a herd that was subsequently named the “clean” herd. Cows were moved to the “clean” herd within 1 week of calving throughout the calving season. The other three positive

bulls were kept in the “infected” herd, together with cows that were still due to calve. Young heifers were removed from the herd and taken to a separate (third) camp with a new bull that was tested and found to be not infected.

BULLS

Herd bulls were tested for a second time by culture and PCR early in 2011 and the results correlated.

FEMALE ANIMALS

During early 2011 a total of 84 cows were examined for pregnancy by rectal palpation and only 35 were pregnant. The 49 empty ones were scanned ultrasonographically and 7% of these had endometritis. The discharge from two of these cows were sampled for PCR and Culture. *Tritrichomonas foetus* was identified on a wet smear prepared from one of these cows. About 4% of the non-pregnant cows were said to have aborted during the preceding months.

THE EFFECT OF TRICHOMONOSIS ON HERD DYNAMICS

Table 1 summarises the data from the herd over the preceding 5 years. There was a decline in the calving rate in the year 2009 to 74%. It then recovered somewhat in 2010, a result of cows that failed to calve in 2009, and then calved in 2010. The average inter calving period (number of days between two consecutive calvings) for the whole herd slightly increased in the year 2010 and then dramatically increased in 2011. Although this trend is present in multiparous cows, it is most pronounced in the first calvers who had the most prolonged inter calving period, already in 2009. Initially the age at first calving was around 850 days but in the year 2010, it increased by more than 6 months to 1060 days. Beginning in 2010, the calving period extended into January and February which was not the case in earlier years. The calving peak, which occurred around August to November in previous years (purple lines in figure 1), was much lower and longer in 2010 (green line in figure 1).

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Table 1: Summary of herd reproductive performance over the preceding 5 years

Year	Age at First Calving (AFC)	Inter Calving Period ICP (Herd)	ICP (multiparous)	ICP (first calvers)	Calving Rate (% per year)
2007	Not known	392days*	Not known	Not known	22/23 = 96%*
2008	863days	416days	395days	431 days	49/55 = 89%*
2009	820days	402days	398days	399days	50/68 =74%
2010	1060days	442days	424days	600days	77/89 = 87%
2011	Not known	474days*	448days*	521days*	44/55 = 80%*

*Incomplete data

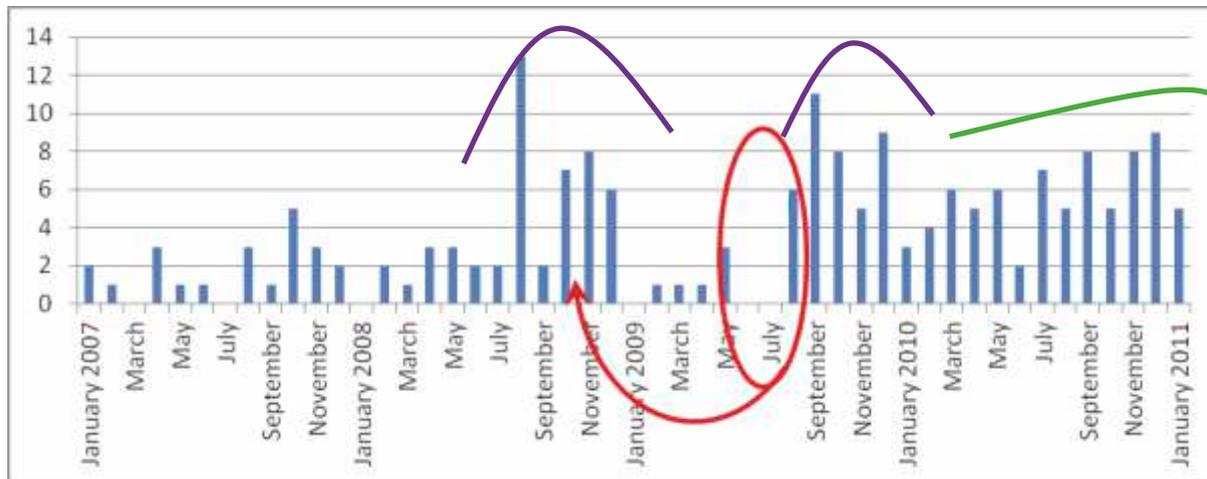


Figure 1: Number of calves born per month from January 2007 until January 2010

The observed trend suggests that the herd was initially infected with Trichomonosis during the early part of 2009 or even late in 2008. The red circle in figure 2 indicates a gap in calf births, which was likely the acute effect of Trichomonosis in a naïve herd, indicating the most likely time of infection to be October 2008 (indicated by the red arrow, 9 months before June 2009). The inter-calving period was increased by about two months which is a significant loss in production. The delay in the time of first calving may have led to some calves being born 2 months later in the following calving season, when adequate fodder may no longer be available. This also meant that the calves would have been weaned later than usual, or would be sold before reaching the desired weight, depending on the weaning policy. The calving season, being spread over several months, complicates herd management. The increased range in ages of calves increases labour inputs and other overhead costs if routine procedures cannot be done for all calves at once, eg strategic deworming, branding, dehorning etc.

THE FINANCIAL IMPLICATIONS OF TRICHOMONOSIS IN THE HERD

Due to the fact that a restricted breeding season was not practiced in this herd, it was not easy to calculate the financial impact of the infection in the herd. For the same reason it was also not easy to detect

the infection at an early stage, while it seems to have been present for more than a year preceding the first veterinary investigation. From the above findings however, we can estimate the financial cost of the infection in the following parts:

1. Loss of calves due to reduced calving rate. It is estimated from the herd data, that approximately 10 less calves were born per year from 2009 to 2011 compared to the norm of the previous few years. This translates directly to R 37,800 per year at an average weaner price of R18.00/kg (current value) and average weaner mass of 210kg.
2. Loss of replacement heifers born. Due to the (sound) strategy of replacing cows only from heifers born in the herd, it would be difficult to maintain the herd numbers in the following few years due to a decreased calf crop in 2009 to 2011. This will force the farmer to either keep some less productive cows in the herd for longer (also increasing the risk of maintaining the Trichomonas infection in the herd), or to buy in new replacement stock. This cost is difficult to estimate, but one could say that about 5 less heifer calves were born in 2009 to 2011. This will force the farmer to

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buy 5 heifers at a current market value of approximately R6000 each, in other words a total loss of R30,000 per year (current value).

3. Interest lost: this loss occurs due to the cost of delayed calving, and therefore delayed marketing. It seems from the data presented, that the farmer managed in previous years to market a significant calf crop in May-July each year. In 2010 to 2012 the farmer was likely to market the majority of the calves only in November. The table below demonstrates the calculation of real interest (interest relative to inflation rate) lost in the herd, and estimates this at R 2,494.80 until the end of 2011. Interest losses were likely to continue into 2012, and escalate if the disease was not controlled.

Table 2: Interest lost due to delayed calving as a result of Trichomonosis

Marketing date of calves	Number of calves		Current values			Real interest lost
	Clean herd	Affected herd	Income (clean herd)	Income (affected herd)	Income lost	
November 2008	13	13	R 49,140.00	R 49,140.00	R 0.00	
May 2009	36	36	R 136,080.00	R 136,080.00	R 0.00	
November 2009	16	6	R 60,480.00	R 22,680.00	R 37,800.00	
May 2010	55	42	R 207,900.00	R 158,760.00	R 49,140.00	R 756.00
November 2010	25	30	R 94,500.00	R 113,400.00	-R 18,900.00	R 982.80
May 2011	55	40	R 207,900.00	R 151,200.00	R 56,700.00	-R 378.00
November 2011	0	33	R 0.00	R 124,740.00		R 1,134.00
TOTAL	200	200	R 756,000.00	R 756,000.00		R 2,494.80

- 4. Veterinary costs due to the current outbreak.
- 5. Other losses that were not easy to quantify would arise from the increased cost of management during and after the calving period. In this case this period is prolonged over several months thus making it more difficult to manage. It is estimated that labour costs could have been increased by R2,500 per year, or R5,000 over the two-year period.
- 6. Marketing losses would also be incurred due to the fact that the herd cannot be certified free from trichomonosis. Although these are also difficult to quantify, it is imperative to note that in the long term, profitable marketing of heifers and cows from an infected herd will be difficult.

All the above financial losses over the two-year period adds up to more or less R1 50,000.00, being a very significant loss for a herd of this small size.

RECOMMENDATIONS MADE

The above mentioned losses warranted control of the disease instead of living with it. It was recommended that the farmer should consult with the veterinarian for biosecurity and control measures as the next step. In order to reduce the impact of Trichomonosis in the following breeding season, the following strategies were proposed for consideration:

- 1. Running separate clean and infected herds simultaneously. All heifers should be separated from the rest of the herd before reaching the reproductive age and kept in a separate group/herd. This should be continued over a period of 3 to five years to try and build a clean herd from the heifers. At the same time, the infected herd should be shrunk by culling all cows that have metritis, those that abort and those that are not pregnant two months after the end of the breeding period.

- 2. Remove bulls and repeat pregnancy testing 2 months later, when all empty cows should be culled. The remaining cows should be kept in a separate herd without a bull until 6 months after calving, when they can be joined with clean bulls again. This strategy, however, is likely to lead to a decline in herd size, in which case some pregnant cows need to be purchased as replacements.
- 3. Implementing artificial insemination (AI) is an alternative strategy. It is important to use semen subjected to thorough biosecurity surveillance as this and other diseases can be spread by AI. Synchronisation programs may be useful to improve AI success.



Biosecurity measures must be put in place to control the disease in future. Bulls should be tested prior to every breeding season. Positive bulls should be culled and replaced with virgin bulls or bulls that have been certified negative. It is also important to practise a short breeding season (90 days or less) and pregnancy diagnosis should be done 2 months after the end of the breeding season. Shorter breeding seasons will make it easier to detect such problems at an earlier stage, apart from other advantages. To prevent the spread of the disease from the neighbourhood, good fences must be maintained. Purchasing of open cows or heifers which have been with a bull should be strongly discouraged.

CONCLUSION

It can be concluded from this case study that the initial financial implications of *Trichomonas* infection in a naïve herd are far more severe than the later financial implications. Two to three years after initial infection, the effects are less obvious, in particular in a herd where a restricted breeding season is not practised, and the disease becomes more erosive in nature. However, the financial implications still warrant intervention.

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