

# A Case Report - Bovine Parasitic Otitis in Cattle of Taita-Taveta District, Kenya

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**Abstract:** Here we describe an outbreak of bovine parasitic otitis on three ranches in the coastal region of Kenya. The unilateral or bilateral ear infection is initiated by the infestation of the nematode *Rhabditis bovis*, which eventually manifests as a secondary bacterial infection and/or larval myiasis leading to clinical symptoms and sometimes death of the affected cattle. Depending on the start period of the disease on each of the ranches, the number of animals affected varied from four to fifty percent. Physical examination of ears in early stages showed the *Rhabditis* worms as a 'shimmering' creamy white blob, which on removal showed beginnings of denudation of the mucosa. In later stages, purulent secretion with a liquefactive necrosis was observed following bacterial infections resulting in head shaking and/or banging causing death or early slaughter of some animals. Four hand-mixed drugs were applied as treatment, but were not effective for long periods since re-infestation from the sources led to reappearance of infection in the animals. The nematode is a free living worm found in soil or organic material, and suspected sources of infestations on the ranches were either the night enclosures or dirty dipping tanks. Consistent maintenance of cleanliness of these suspected sources was difficult, especially in the larger enterprises. A constant vigilance with rightly timed treatment and hygiene is necessary to prevent and/or control the disease.

**Keywords:** Cattle, Parasitic, Otitis, *Rhabditis*, Infestation, Infection, Bacteria, Myiasis

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## 1. Introduction

Nematodes in the Order Rhabditida are minute, free-living saprophytes in soil. Within this order, a small number of species of the genera *Rhabditis* and *Pelodera* are opportunistic parasites and a very few may have a life stage as an obligate parasite.

Jibbo described the condition of bovine parasitic otitis as a primary infestation of the ear by a free living nematode, *Rhabditis bovis*, which was frequently followed by a secondary bacterial infection and myiasis due to *Chrysoma* larvae [1]. This report was based on observations made on a ranch in Tanganyika (present day Tanzania) and gave details of the etiology, clinical signs, post-mortem lesions, treatment and control of the infestation. Costs of drug for treatment, cattle handling and decreased production associated with wasting and deaths results in substantial financial loss [2, 3].

In Kenya, the first mention of a similar disease syndrome without the reference to a nematode was in 1956 [4]. An intensive investigation of middle ear infection in Boran cattle (*Bos indicus*) of the ranching areas of Rumuruti, Kenya was reported in 1960 [5]. Detailed examination of the ears of slaughtered cattle showed that the infection originated in the outer ear. *Rhabditis bovis* worms were found at the base of the pinna and the meatus of one or both ears of 26 heads examined. The lesion in the middle ear was a liquefactive necrosis of the petrous temporal bone. *Corynebacterium* spp. were commonly isolated from the middle ear lesions. Several outbreaks of parasitic bovine otitis were then reported during the period 1969-1972 in Narok and Solai [6-8].

The present report is based on an investigation of an outbreak of bovine parasitic otitis on three ranches in Taita-Taveta district of Kenya.

## 2. Clinical History

### 2.1. Ranch 1

The ranch covered an area of 106,000 acres. It had 5096 Boran cattle which were housed at night in open air small enclosures/bomas. These enclosures had not been changed for the previous three years. There were three acaricide dips on the ranch.

Some 200 animals were presented at the time of the first visit. Approximately half of these had unilateral ear infestation while the rest were bilaterally infested. The disease was observed to be more frequently in young bulls and steers.

### 2.2. Ranch 2

This ranch of 53,000 acres had 900 Boran and Sahiwal cattle kept in two night enclosures, which had been in use for the previous two years. There were two acaricide dips on the ranch. The disease in cattle was first noticed after introduction of new steers from a neighboring ranch. One or both the ears were affected in nearly fifty per cent of the animals with the disease more prevalent in one to two year old animals. Before the investigative visit the 10 animals had died or were sacrificed due to the disease and 30 more were sent for slaughter on the day of visit, all these animals were showing other clinical signs such as circling and head shaking and/or butting.

### 2.3. Ranch 3

The third ranch was 101,250 acres and had 4,500 Boran and Sahiwal crosses housed in five night enclosures. These enclosures had been in use for the previous three years. The ranch had three acaricide dips. The first few cases of the disease may have occurred early but the morbidity was low until five years later, when the rate increased drastically. The disease was observed to be more widespread during the rainy season and amongst younger animals.

## 3. Clinical Signs

The infestation was first noticed as a wet patch due to serous discharge running down just below the ear with some animals having a swelling at the base of the pinnae. There was also much flapping of the ears especially at night probably due to inflammation and pain.

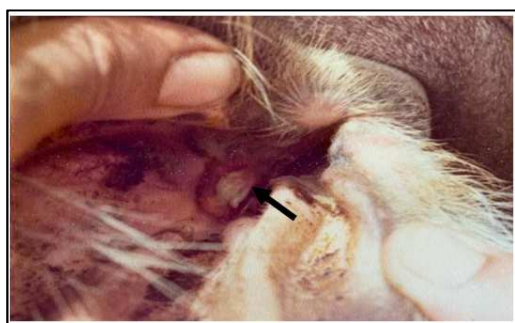


Figure 1. Nematode cluster as creamish 'shimmering' blob.

A 'shimmering' effect due to the motility of the nematodes was observed on examination of the external meatus of some acute cases. In very early cases, the nematodes were not obvious but swabbing of the external ear canal with a gloved finger yielded the worm.

In most cases, the nematodes were seen as a blob of shining purulent material after irrigation of the meatus with saline solution (Figure 1). The mucosa around this blob was congested and petechial hemorrhages were observed on removal of the nematodes (Figure 2). In ears with secondary infection, there was necrosis and ulceration accompanied by bleeding. In many cases with the secondary infection the external auditory meatus was blocked by necrotic and purulent material.

A putrid odor emanating from such ears attracted flies, mainly of *Chrysomya* spp. which led to myiasis in several of the cases. The sub-aural regional lymph nodes were swollen measuring from 5 to 9 cm in diameter in the animals with secondary ear infection. The head would be tilted to the side with most severely affected ear in such cases, and as the infection progressed without treatment, the animals lost body condition. Furthermore, the animals became unsteady and many a times falling down and/or bumping into objects and such animals were either slaughtered, died by drowning during dipping or injured themselves and were sacrificed.

The death rate of infested animals in all the three ranches was nearly five per cent.

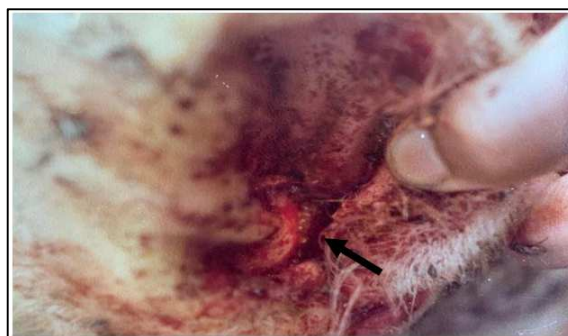


Figure 2. Necrosis and ulceration of the mucosa.

## 4. Etiology

Nematodes recovered from infected ears were preserved in 70% ethyl alcohol and subsequently identified as *Rhabditis bovis* (Kreig, 1960).

Bacteriological examination of swabs from the infected ears yielded *Corynebacterium bovis*. Most of the cultures had *Proteus mirabilis* and some had *Staphylococcus aureus* and *Streptococcus bovis*. *Corynebacterium pyogenes* isolates were sensitive to penicillin, ampicillin and tetracyclines.

## 5. Treatment

All the three ranches had tried out various prophylactic treatments without much success, and included i) hydrogen peroxide rinse either alone or in combination with an

antibiotic such as oxytetracyclines or streptomycin-penicillin given parenterally, ii) local application of thiophosphaste - methylcerbemet - sulphonamide powder . marketed as Negasunt® (Bayer, Leverkusen, Germany) either alone or in combination with parenteral oxytetracycline, iii) Organophosphate acaricide and iv) acridine compounds.

During the initial visit to the ranches, the following drug preparations were recommended for use either singly or in combination -i) Compound A - Salicylic acid (5 gm), Tannic acid (5 gm) in 70% alcohol, ii) Compound B - a 10% ointment of dimethylester of phosphoric acid (trichlorfon), prepared from Neguvon® powder (Bayer, Leverkusen, Germany), iii) Compound C - 0.8 per cent solution of oxytetracycline powder in normal saline and iv) Compound D - A mixture of 50% solution of dimethylester of phosphonic acid (trichlorfon) (Neguvon® injectable, Bayer, Leverkusen, Germany) and 0.5% atropine sulfate at dose of 10 ml/animal intramuscularly. Compounds A, B and C were applied locally.

On follow-up visits, the response to these compounds was recorded. Curative effects were assessed by comparing untreated versus treated pair of infested ear of randomly selected animals. There was no single and/or combinations which were effective for long periods. The best response was with the combination of compounds A and B. In secondarily infected animals, an initial wash with A and C followed by an application of B was sufficient to save the animals from premature slaughter. However, there being a continuous source of infestation many animals became re-infested within 15 days of treatment and required reapplication of the compounds. For herd health, it was necessary to maintain the treatment on a continuous basis as fresh cases appeared.

## 6. Discussion

Most species of nematodes in the *Rhabditis* genus reside freely in decaying organic material such as manure and are saprophytic. However, there are a few species whose larval stages have been reported to be opportunistic by causing infections in humans and animals [9]. It has been reported that *R. axei* larval stages may be parasitic under certain conditions, including immunosuppression in host [10-13]. *R. strongyloides* has been found in pustules in dogs and occasionally in cattle [14]. Another strongyloides, *Pelodera strongyloides* has been associated with dermatitis in dogs and cattle [15-17]. In tropical countries of Africa, *R. bovis* is the main species in the infestation and causing bovine parasitic otitis but in South America the disease is caused mainly by *R. freitasi*, *R. costai* and *R. blumi* [1, 2, 5, 18-21].

A clinical manifestation of serous discharge from affected ears followed by purulent material with foul odor in almost all infested animals has been reported by others as well. Few of these animals may show restlessness, head shaking or banging and recumbency especially if myiasis is present [18].

The treatments used in here were subsequently studied under more controlled conditions in an outbreak, and the results indicated that three repeated applications, at an interval of 2 weeks, of compounds B and C combined were more

effective [18]. However, such or similar regimen is very labor intensive and others have tested alternative drugs and biological control to manage infestation at herd level [22]. Parenteral administration of Ivermectin (Ivomec®, Merck Sharp Dohme, NJ, USA) has been noted to be very effective [23]; however this is a very exorbitant drug for use in a herd health situation. Recent report the local application of ivermectin combined with either/or 10% dimethylsulphoxide and *Duddingtonia flagrans* may be a cheaper alternative albeit more labor intensive [24] Nicotine extract at approximately 2 ppm to 0.25% toxaphene dip was effective at managing nematode infestations of ears of cattle that were not secondarily infected. Furthermore, the use of nicotine extract eliminated the nematodes within 48 hrs [25].

The use of night paddocks favors the proliferation and dissemination of these nematodes [1]. In this study the source of infestation with *Rhabditis* was not identified but was thought to be either the bomas/night enclosures or the dips. The enclosures had not been changed or cleaned for several years, and there was about 5-6 inches deep layer of manure in most of the enclosures examined. However, to note that the parasitic otitis was not a problem in one of the ranches until there were new cattle introductions. Similar introductions have been suspected to cause an outbreak of the disease following procuring new animals from endemic areas [26]. Once introduced the nematode could survive and breed in the organic matter present in the enclosures, especially during the wet season [18]. Similarly, the dips on the three ranches had not been cleaned for some years. A thick layer of scum was present on the surface on each of the dips, which again may have been ideal for nematode breeding. Dips used for tick control have been strongly implicated in the transmission of the nematode as *R. bovis* has been shown to survive for nearly a month in 0.25% toxaphene containing dips [1, 2].

The fly population (*Musca spp.*, *Chrysoma spp.*, and *Stomoxys spp.*) was very high on the ranches. It is probable that these flies may play a role in transmission of the nematode eggs/larvae from one animal to another as suggested in certain outbreaks in Brazil and Colombia [27]. However, this is contradicted by other reports [28] and may relate to the presence or absence of the species of flies on the ranch at that particular period.

The drooping conformation of the ears of Boran and Sahiwal cattle may perhaps provide a suitable humid environment for the nematodes to settle and multiply. The predilection for infestation of drooping ears has been also been reported in other zebu cattle [27-30]. The irritation caused by the nematodes leads to superficial dermatitis which becomes secondarily infected with bacteria. In this study, *Corynebacterium pyogenes* and *Proteus mirabilis* were common isolations; however *Staphylococcus aureus* and *Streptococcus bovis* were also isolated. In addition to these bacteria, others have reported isolations of *Psuedomonas spp.* Thus, use of antibiotics is recommended to control secondary infections [2, 3, 18].

We recommended to the management to either move or clean the enclosures on a regular basis and also to clean and

the dips on regular basis so that the breeding of the nematodes and exposure of cattle to contaminated material were minimized to control and/or eliminate infestation of ears. These recommendations have proved to be an inexpensive long term prophylactic solutions [3].

## 7. Conclusion

This paper reports on an outbreak of ear infections in cattle initiated by a saprophytic nematode, *Rhabditis bovis*. The suspected sources of infestation with worms were dirty night enclosures and/or dipping tanks on the three ranches in the ecological zones III and IV of Kenya. The mild dermatitis caused by the worms became secondarily infected by bacteria, sometimes leading to myiasis causing various clinical signs [23]. Treatment with hand mixed drugs was effective for short periods as the animals became re-infested from the presumed dirty sources. Thus, maintaining cleanliness of the night enclosures and the dipping tanks with routine treatment of affected animals would minimize production losses.

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