

RESEARCH COMMUNICATION

Brucella melitensis biotype 1 outbreak in goats in northern KwaZulu-Natal

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ABSTRACT

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Brucella melitensis biotype 1 was confirmed in indigenous, outbred goats in three northern districts of the KwaZulu-Natal province following the diagnosis of human Malta fever in the same area. Six foci of infection were found during an extensive serological survey involving 6 266 goats carried out in most of the districts of the KwaZulu-Natal province. The prevalence in the positive herds varied between 17% and 100%. The diagnosis was confirmed by culturing milk samples from serologically positive animals. Infected goats were found in only three districts (Ubombo, Ingwavuma and Pongola) and all infected herds fell within a 50-km radius.

Keywords: Abortions, *Brucella melitensis*, goats, Malta fever

INTRODUCTION

The natural hosts of *Brucella melitensis* are mature goats and certain breeds of sheep, among which it spreads quickly and causes abortion, reduced milk yield and orchitis (Alton 1990a). It is the least host-specific of the *Brucella* species and, from a source of infected goats, transmits to various other species. *Brucella melitensis* is pathogenic to man, causing one of the most serious zoonoses, known as Malta or Mediterranean fever.

Susceptible animals usually become infected by inhalation or ingestion when large numbers of bacteria are shed during the birth process or at abortion. Although the ram can become infected, it does not

play a significant role in the spread of the disease. This organism was first isolated on the island of Malta by Bruce in 1887 from the spleens of soldiers that had died of Malta fever (Alton 1990b). The source of the infection was traced to goats, some 20 years later. *Brucella melitensis* is thought to have originated from the Mediterranean, but now also occurs in Central Asia, parts of Latin America and sporadically in the USA, northern Europe and Africa.

The first documented outbreak of *B. melitensis* (in sheep) in South Africa occurred during 1965, in the then Transvaal province (Van Drimmelen 1965). Since then, only one case was identified during 1989, in a herd of Boer goats on a small holding near Pretoria (Ribiero, Herr, Chaparro & Van der Vyver 1990).

The survey reported here, was launched after the diagnosis of Malta fever in the owner of a herd of goats, adjacent to the Makhatini Agricultural Research Station. The owner had contracted a disease with malaria-like symptoms that a medical specialist in Empanjeni later diagnosed as Malta fever. Some weeks

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later, this owner's goatherd was also found to be infected.

The owner's request to investigate his herd as a possible source of infection was referred to the Vryheid Veterinary Laboratory (Vryheid VL) by personnel from the Makhathini Research Station. During September 1994, fourteen goats from this herd were bled and the samples sent to the Onderstepoort Veterinary Institute (OVI) and Allerton Regional Veterinary Laboratory (Allerton RVL) for *Brucella* serology. The herd, which had not been vaccinated with Rev 1 vaccine, had a history of abortions during the previous season. Twelve of these goats were Rose Bengal Test (Herr, Bishop, Bolton & Van der Merwe 1979) positive and had antibody levels ranging from 196–784 IU *B. abortus* complement-fixing antibody ml^{-1} . Identical results were achieved with both *B. abortus* and *B. melitensis* standard antigens. *Brucella melitensis*, wild strain, was isolated at Vryheid VL and Allerton RVL from the milk of seven goats that had aborted during the previous two months. Identification of the pathogen was based on the criteria set out by Alton, Jones, Jones, Angus & Verger 1988 and the OVI typed the isolates as *B. melitensis* biotype 1. The entire herd of 21 goats was then culled and specimens were collected from the 12 serologically positive animals for bacteriological culture. Specimens cultured included milk, uterus, udder, supramammary and iliac lymph nodes. Five of the goats yielded *B. melitensis*.

A serological survey was carried out in the KwaZulu-Natal province during the period October, 1994 to April, 1995. Goats were selected from dip-tanks and farms randomly selected throughout the province, but the goats in the districts of Ingwavuma, Pongola, Simdlangentsha and Ubombo were bled more intensively. It was assumed that the animals which gathered at each dip-tank were fairly representative of the goats of that particular area. The areas served by each tank usually fell within a radius of approximately 7 km. Approximately 10% of mature ewes at each locality were bled.

As far as could be ascertained, none of the goats in the area were vaccinated with *B. melitensis* Rev 1 vaccine, therefore the Rose Bengal Test (RBT) with *B. abortus* antigen, was used as a screening test. The Complement Fixation Test (CFT) (Herr, *et al.* 1979) was used as the definitive test for all RBT-positive sera.

In total, 6 266 goats, representing 258 different herds (252 negative, six positive), were tested throughout the KwaZulu-Natal province. The animals of one farm, out of a total of 160 bled, and three out of 11 dip-tanks (5 herds) tested positive. All these herds were within a 50-km radius. The localization of this outbreak (see Fig. 1) may be because goats in the infected areas are farmed on a subsistence basis with very little movement to outlying areas.

This is the third confirmed isolation of *B. melitensis* wild strain in South Africa, the first large-scale outbreak among goats and, potentially, the most explosive. It is probable that the disease would have remained undetected were it not for the diagnosis in a single human patient that was brought to the attention of the Vryheid VL. Furthermore, in the Ubombo district, the abortion rate in the *B. melitensis*-positive herds was similar to that in the negative herds and would probably not have initiated an investigation into the disease.

The two human cases were both associated with the first herd identified as positive. Owing to the poor infrastructure, the remoteness of the area and presence of other serious diseases, the true prevalence of Malta fever in humans will be very difficult to ascertain. Fortunately very few, if any, of the local population drink goats' milk and, as this is possibly the most important source of infection, the disease may not assume serious proportions in that population.

Our surveys seem to indicate a surprisingly slow rate of spread, with fewer abortions having occurred than reported in other countries (Alton 1990a). Furthermore, no indication of spread to in-contact cattle has so far been found, although this threat remains a distinct possibility.

The current policy of the Directorate of Animal Health is to try to eradicate the disease, because of the serious zoonotic implications and the potential threat to the small stock and cattle in other parts of the country. This policy may yet, however, be influenced by the status of this disease in the neighbouring countries of Swaziland and Mozambique. Further surveys are being conducted in the KwaZulu-Natal province.

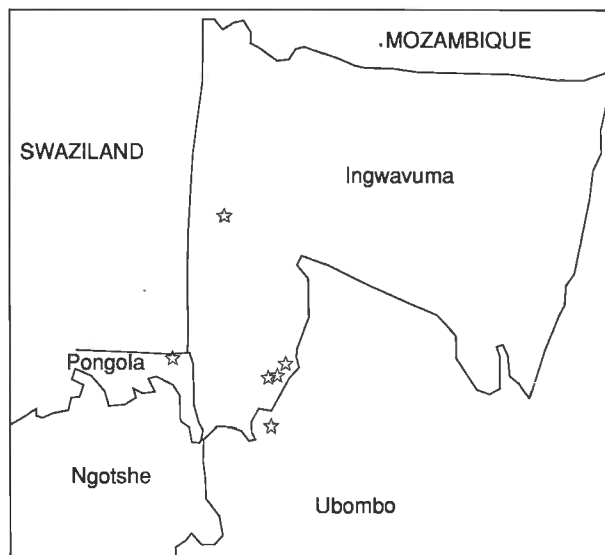


FIG. 1 Location of *B. melitensis*-infected goat herds

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