

BRUCELLOSIS IN CATTLE – a diagnostic nightmare

– Dr Chriche du Plessis

In our last article we discussed brucellosis in more detail with regards to the disease and the prevention and control measures that can be put in place. In this article we will focus on the difficulty in diagnosing the disease.

Difficulties with Diagnosing the Disease Correctly

As *Brucella* organisms hide away in the cells of the body and are only in the bloodstream for a very short period of time, tests to pick up the organism itself are very difficult to perform. We have to rely on tests that pick up the presence of the organism in the body. These we call antibody tests. Antibodies are the body's first line of defence against infection.

Antibodies are formed by the immune system when a foreign organism enters the body. When the immune system is functioning optimally, antibodies play an important role in clearing infections. Once the animal is healthy and free of the infecting organism, antibodies remain in the bloodstream attesting to the presence of a past infection. In stress conditions such as under-nutrition, internal parasite infection and sometimes even pregnancy, this defence mechanism is compromised.

Brucella antibodies share characteristics with the antibodies of some other organisms such as *Salmonella* and *E.coli*. This may result in false positive tests thus impacting on the interpretation of results when performing the Milk Ring Test.

When we vaccinate an animal, the body has the same reaction as it would have against a natural infection. In some cases, as with the S19 vaccine strain, this antibody reaction can be prolonged interfering with *Brucella* screening tests. In the case of the RB51 vaccine strain no antibodies are detected following vaccination. The antibodies tested for in serology (blood) tests are not produced after vaccination with the RB51 vaccine strain, hence serology tests remain negative. However should a vaccinated animal be challenged by a field strain, the body will react and antibodies will be formed, resulting in positive tests despite vaccination.

It is thus extremely difficult to interpret test results accurately based on an isolated sample and without the full herd vaccination history. To determine if an animal is infected requires repeated testing. Your State Veterinarian will advise on the different tests needed to confirm a positive diagnosis.

The Tests Available

Milk Ring Test

In dairies the most commonly used test is the Milk Ring Test. This is routinely done on the bulk milk tank. The test is extremely sensitive. That means that it can have the potential for testing a lot of negative herds positive. It can be compared to the saying – for every bit of smoke

there is a fire. The Milk Ring Test picks up all the smoke signals even if there isn't a raging veld fire. These smoke signals can be the result of a 'braaivleis' or your neighbour smoking.

The Milk Ring Test tests for antibodies against *Brucella* present in the milk and can detect antibodies in the bulk milk tank even when as few as 1 or 2 cows in a 700 cow milking herd are infected with *Brucella*. False positive results could be due to cows with a high somatic cell count contributing to the bulk milk tank, such as cows with mastitis, colostrum or late lactation milk.

Serum Agglutination Tests

For these tests, blood is taken and sent to the laboratory. These tests are only done on individual animals. The laboratory uses the serum of the animal to test for antibodies. They use a special solution that they mix with the serum. If there are antibodies in the blood it will bind to the solution and a colour reaction will occur. Even though it sounds simple these tests are technically very difficult to perform.

Two of these tests, the RBT (Rose Bengal Test) and CFT (Complement Fixation Test) are the most commonly performed in South Africa. The RBT is like the Milk Ring Test, it sees all the smoke signals. The CFT then weeds out all the smoke signals to see the real veld fires.

Culture

Culture of *Brucella* organisms is the definitive test confirming an infection. In the early stages of an infection a blood sample can be taken to try and culture the bacteria in the blood. This is extremely difficult and more often than not the test will not give the desired result. Culture is used more successfully on any aborted material and lymph node biopsies taken after a positively tested cow has been slaughtered. Milk and udder tissue can be used for culturing as well. Culture tests can take up to 2 weeks to show any growth.

One other test exists, namely the Brucellin Skin Test. It is similar to a TB (tuberculosis) test but is not currently available or allowed in South Africa.

As is evident from the above, brucellosis testing is not as clear cut as one would like. There are numerous factors taken into account before an animal/herd is eventually declared positive. However, due to the importance of the disease each positive test should be thoroughly investigated. Ignoring smoke signals could result in a devastating raging fire.

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