

# BRUCELLOSIS IN FREE-LIVING AFRICAN BUFFALO (*SYNCERUS CAFFER*): A SEROLOGICAL SURVEY

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### ABSTRACT

HERR, S. & MARSHALL, C., 1981. Brucellosis in free-living African buffalo (*Syncerus caffer*): a serological survey. *Onderstepoort Journal of Veterinary Research*, 48, 133-134 (1981).

The rose bengal and complement fixation tests were successfully applied to buffalo (*Syncerus caffer*) sera. An overall occurrence of 23% positive reactors was obtained, but *Brucella* infection does not appear to act as an effective culling agent in buffalo. Any eradication programme must take free-living buffalo into account as a possible source of re-infection for cattle.

### Résumé

LA BRUCELLOSE CHEZ LE BUFFLE AFRICAÏN (*SYNCERUS CAFFER*) EN LIBERTÉ: UNE ENQUÊTE SÉROLOGIQUE

Les tests rose bengal et fixation du complément ont été fructueusement appliqués aux sera du buffle (*Syncerus caffer*). Une fréquence d'ensemble de 23% de réacteurs positifs fut obtenue, mais l'infection à *Brucella* n'apparaît pas agir comme agent d'élimination chez le buffle. N'importe quel programme d'éradication doit prendre en considération le buffle en liberté, comme source possible de ré-infection du bétail.

### INTRODUCTION

In any brucellosis eradication programme in situations where there may be intermingling of domestic and wild species, it becomes important to consider the presence and rate of infection in the free-living species as a possible source of re-infection. The African buffalo (*Syncerus caffer*), being closely related to domestic cattle and sometimes having contact with them, would be a likely source of such infection.

Serological surveys on buffalo (De Vos & Van Niekerk, 1969; Condy & Vickers, 1972), using the serum agglutination test (SAT) and taking a 50% reaction in the 1/40 dilution (equivalent to 80 IU/ml or higher) as positive, showed 11 and 14.7% positive reactors respectively. Subsequently, Condy & Vickers (1976), by adding the complement fixation test (CFT) and taking positive values as 50% haemolysis in the 1/10 dilution or higher (equivalent to 45 IU/ml or higher), found the percentage to be 22.6%.

Although none of the above workers correlated serological titres with isolation of *Brucella abortus*, infection with biotype 1 was proved by Gradwell, Schutte, Van Niekerk & Roux (1977) in buffalo in the Kruger National Park.

In cattle the SAT has proved unreliable in 2 respects; namely, in showing a large percentage of non-specific reactions, and in missing a considerable number of positive cases. At the same time the rose bengal test (RBT) has proved most valuable as a screening procedure in the same circumstances and the CFT the best sensitivity and specificity (Alton, Jones & Pietz, 1975; Crawford & Hidalgo, 1977). The RBT to the best of our knowledge has never before been used in buffalo. In this survey, all 3 of these tests were applied to sera collected from buffalo in routine culling operations in the Kruger National Park.

### MATERIALS AND METHODS

#### Sera

Blood was collected from 108 buffalo during routine culling procedures in the Kruger National Park. These comprised 37 adult females, 21 adult males, 16 juvenile females (heifers older than approximately 6 months),

13 juvenile males, 10 female calves and 11 male calves. Immediately after death, 10 ml blood samples were taken in sterile bottles, kept at ambient temperature for up to 4 hours and then refrigerated (4-7 °C) for up to 1 week before the serum was centrifuged and decanted.

#### Serology

Three serological tests were applied to each serum. The RBT was done, using 0.05 ml volumes of serum and antigen in WHO haemagglutination plates. The SAT was carried out in tubes, using total 2 ml volumes and doubling dilutions with a final dilution of 1/80. The microtitre system was used for the CFT, and the final serum dilution fixed at 1/128. Antigens were supplied by the Veterinary Research Institute, Onderstepoort, and the methods employed and the reporting of titres in International Units/ml (IU/ml) are those practised at the Institute (Herr, Bishop, Bolton & Van der Merwe, 1979), as modifications of the methods of Morgan, Mackinnon, Gill, Gower & Norris (1978) and Alton *et al.* (1975).

### RESULTS

Out of the 37 buffalo cows tested, 16 showed some reaction in 1 or more tests (Table 1). When the CFT was applied as the definitive test and a titre of 30 IU/ml or higher taken as positive, then 14 (37.8%) animals in this group would be so classified. Amongst

TABLE 1 Incidence of positive serological tests in buffalo cows

No. of samples	Rose bengal test	Serum agglutination test IU/ml	Complement fixation test IU/ml
7.....	+( <sup>1</sup> )	212	240-784
1.....	+	34	60
1.....	+	47	30
1.....	-( <sup>2</sup> )	20	—
1.....	+	34	392
1.....	+	106	784
1.....	+	47	120
1.....	+	53	196
1.....	—	27	30
1.....	+	—	A/C( <sup>3</sup> )
21.....	—	—	—

(<sup>1</sup>) + = positive

(<sup>2</sup>) - = negative

(<sup>3</sup>) A/C = Anti-complementary

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the bulls, 6 (28,5%) proved positive (Table 2), while in the other groups (Tables 3-4) the percentage dropped to 25% for the heifer group, 7,7% for the male juveniles and 0% for the calves. A single case in the heifer group and 2 cases amongst the calves showed a very high SAT titre but were completely negative to the CFT. Only 1 serum proved to be anti-complementary (A/C) and no prozones were seen in the CFT.

TABLE 2 Incidence of positive serological tests in buffalo bulls

No. of samples	Rose bengal test	Serum agglutination test IU/ml	Complement fixation test IU/ml
3.....	+	160-212	392-784
1.....	+	20	49
1.....	+	20	—
1.....	+	67	392
1.....	—	93	—
1.....	—	27	—
1.....	+	80	120
12.....	—	—	120

TABLE 3 Incidence of positive serological tests in female juvenile buffalo

No. of samples	Rose bengal test	Serum agglutination test IU/ml	Complement fixation test IU/ml
2.....	+	212	784
1.....	+	47	60
1.....	—	17	—
1.....	—	17	—
1.....	—	—	60
1.....	+	47	—
1.....	+	—	—
8.....	—	—	—

TABLE 4 Incidence of positive serological tests in male juveniles and calves

No. of samples	Rose bengal test	Serum agglutination test IU/ml	Complement fixation test IU/ml
1.....	+	186	392
3.....	—	212	—
1.....	—	20	—
1.....	+	—	—
28.....	—	—	—

#### DISCUSSION

The incidence of anti-complementary sera in buffalo was as low as in cattle and generally there was a very good correlation between the results obtained by the 3 tests. Also the titres recorded were similar to

those seen in cattle (Herr, unpublished data). The 3 cases of negative RBT and CFT results with high titres in the SAT (Table 4) are unusual, however. No similar phenomenon has been seen or reported in cattle sera. It is possibly significant that all 3 were from males, as serology in bulls is notoriously unreliable (Morgan *et al.*, 1978).

Although the prevalence of positive titres alone cannot be taken as proof of infection, the ease with which the isolation of *Brucella* was achieved in the past (Gradwell *et al.*, 1977), lends credence to the assumption that the serology is specific.

Crawford & Hidalgo (1977) suggested that *Brucella* infection might act as a natural culling agent in American bison. Considering the prevalence seen in this series and as reported by Condy & Vickers (1976), we must concur with the latter authors that *Brucella* is ineffective as a culling agent in buffalo, as the necessity for culling free-living herds at regular intervals shows. Nevertheless, these herds must be considered as a likely source of reinfection for domestic stock where they intermingle.

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