

A FIRST RECORD OF *BRUCELLA ABORTUS* (BANG) IN THE CATTLE OF MAURITIUS; AND DATA ON THE POSSIBLE OCCURRENCE LOCALLY OF UNDULANT FEVER IN MAN

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(With 1 Figure in the Text)

INTRODUCTION

The Island of Mauritius situated in the Indian Ocean, 550 miles east of Madagascar, has previously been considered free from brucellosis either in man or in animals, although abortions in cattle have occurred continually at the Government Dairy since its opening in 1922; the number of abortions, however, was low up to 1926, when seven abortions occurred. Attempts were made to check these losses but without success; and by 1928 some 32% of pregnant cows aborted (Fig. 1).

stomach contents of several foetuses were sent; and, as both the local laboratory and the 'Imperial Bureau of Animal Health, London' failed to find agglutinins for *Br. abortus* in sera from these cows, the view that a streptococcus infection was causing the abortions was strengthened. A streptococcus vaccine was therefore prepared and applied 'in vaginam' to the pregnant cows. The actual number of abortions rapidly diminished (Lionnet, 1934); but the percentage of abortions still represented 12% of the total number of pregnancies and seems to have

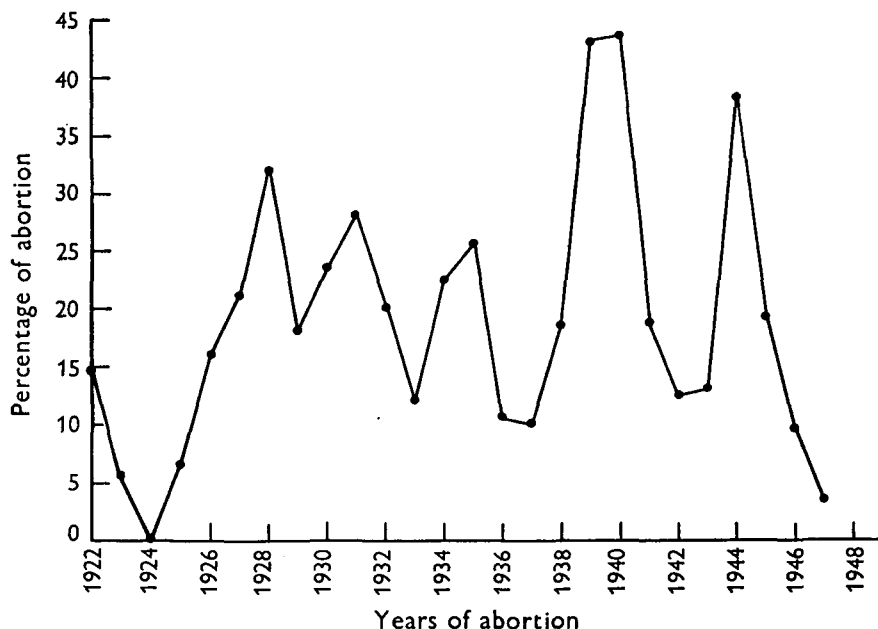


Fig. 1. Showing percentage of abortions in the Government Dairy herd, 1922-47.

In 1931 a streptococcus was isolated both from the blood and the stomach contents of foetuses born prematurely and, as no evidence of brucellosis could be found either culturally or by agglutination tests, this organism was considered to be the cause of these abortions. Confirmation of this streptococcal finding was obtained from the Veterinary Laboratory of Onderspoort in Pretoria, South Africa, to which the

been a normal periodic fall not attributable to the ointment.

In support of this hypothesis, the number and percentage of abortions again rose in 1934, and peaks of increased abortions have alternated with periods of small loss until 1947 when only one abortion occurred (Fig. 1).

MATERIAL AND METHOD

On the 23 December 1947, a foetus born prematurely after 5 months' gestation was brought to the Central Laboratory a few hours after it had been aborted by a cow 'Charlotte 6/7'. Smears of the stomach fluid, stained by Gram's method, showed a certain number of Gram-negative coccobacillary organisms morphologically resembling the *Brucella*. Tubes of liver agar were inoculated and incubated at 37° C. in an atmosphere containing an increased amount of CO₂. After a week a thin film of growth had spread over the slant and was found to consist of the same type of organism as had been seen in the smears of the stomach fluid. This organism was found to possess the following characters:

- (a) Failure of growth in the absence of CO₂.
- (b) Production of H₂S on liver agar, as revealed by lead acetate paper, during 4 consecutive days.
- (c) No fermentation of any of the usual carbohydrates.

(d) Good growth in media containing methyl violet or basic fuchsin in a dilution of 1/100,000 and 1/50,000 respectively, but inhibition of growth by thionin in a dilution of 1/50,000.

(e) Agglutination to full titre by a *Br. abortus* serum prepared by the Standards Laboratory, Medical Research Council (Oxford).

The organism was accordingly classified as *Br. abortus* (Bang).*

SEROLOGY OF THE INFECTED HERD

It now became imperative to ascertain the degree of infection of the whole herd. For this purpose the blood serum of each of the 71 animals of the Government Dairy was tested for its agglutinin contents against two strains of *Br. abortus* (a local, and an East African, Kabete). Formolized suspensions were prepared, according to the standard method recommended by Wilson & Miles (1946), which consists of an emulsion in 0.9% physiological saline of a 48 hr. old culture of the Bang's bacillus on liver agar. The emulsion is then heated at 55° C. for 1 hr. and preserved with formaldehyde at a final concentration of 0.2%.

The results, as seen from Table 1, show that out of 71 cows at the Government Dairy 23.94% reacted to *Br. abortus* at a titre of 1 in 50 and 18.31% in dilutions varying between 1 in 125 and 1 in 25,000.

An attempt was next made to discover if similar conditions existed in private herds. Two hundred samples of blood from cattle from several localities were tested and 10% reacted at 1 in 50 and 1% at 1 in 125 to 1 in 250.

* Since the writing of this paper a further strain has been recorded in similar circumstances.

We have, so far, dealt with *Br. abortus* from the veterinary aspect. The organism of contagious abortion of cattle, however, is also important from the public health point of view. Fevers of unknown origin are by no means uncommon in this country; and one of us (J. L. W.) has recently shown that certain of them are caused by organisms of the coli-anaerogenes group (Webb, 1937) and others by fevers of the typhus group (Webb, 1944). It was therefore thought necessary to ascertain if Undulant fever occurs locally in man.

For this purpose, 250 samples of blood submitted for the Wassermann reaction were tested for their agglutinating properties against *Br. abortus* and 2.4% were found to agglutinate it in dilutions varying between 1 in 25 and 1 in 50.

Table 1. Agglutinating titre of the blood serum of the Government Dairy cows for *Brucella abortus*

No. of animals tested		Agglutinating titres
Mauritius strain	East African strain	
22	22	Negative
20	19	1:25
17	17	1:50
1	2	1:125
1	1	1:250
5	5	1:500
2	2	1:1,250
—	—	1:2,500
—	—	1:5,000
1	2	1:12,500
2	1	1:25,000

DISCUSSION

The morphological, cultural and serological characters of the organism isolated from the stomach contents of a foetus born prematurely at the Government Dairy conform to those of *Br. abortus* (Bang), the dye tests differentiating it from the porcine and caprine strains.

A high agglutinin titre—up to 1 in 25,000—against *Br. abortus* found in the sera of cows from the same herd has given additional proof of the existence of contagious abortion of cattle in this country.

An agglutination titre of 1 in 50 is generally considered to be an indication of a latent or past infection; 1 in 100 that of an active infection and 1 in 200 indicates that *Br. abortus* is being excreted in the milk (Wilson & Miles, 1946). The danger from the presence of excreters of Bang's bacillus from the veterinary and medical standpoints cannot be overestimated. Table 1 shows that roughly 24% of the Government Dairy cows belong to the first group, 18% to the second group and 15% to the third group. Tests from private herds do not give such

high titres, an agglutination in a dilution of 1 in 250 being the highest found, compared with 1 in 25,000 at the Government Dairy. The results obtained are, nevertheless, significant, especially when we remember that the private herds tested are small and that new animals are seldom imported, facts which may account for the very low incidence of abortion (Wilson & Miles, 1946).

As agglutinins for *Br. abortus* may persist in the blood for years after recovery from an attack of Undulant fever (Stitt, Clough & Clough, 1939), many authors have attempted to detect the percentage of that infection in a community by testing sera submitted for the Wassermann reaction. Seltys (1946) in England recorded that 3.6% of such sera contained agglutinins for *Br. abortus* in dilutions of 1 in 20 or over during his 18 years of work on that subject. Joshi (1944) detected 4.13% reactors in Bombay, although the practice of drinking boiled milk is as strong in that country as it is in Mauritius. Locally, 250 samples of blood were tested and 2.4% agglutinated the Bang's bacillus at titres of 1 in 25 and 1 in 50.

These findings suggest the existence of Undulant fever in Mauritius. An attempt is being made to isolate a human strain of *Br. abortus*.

SUMMARY

1. Recovery of a strain of *Brucella abortus* Bang from a foetus aborted by a cow in Mauritius is reported.

2. Agglutination tests performed on samples of blood from cows of the Government Dairy indicate that contagious abortion of cattle is present in this country; approximately 24% of the animals from the Government Dairy belonged to the latent or past infection group; 18% to the active infection group and 15% were presumptive bacilli excretors.

3. As a result of agglutination tests with the blood serum from man Undulant fever due to *Br. abortus* is suspected to occur in Mauritius.

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