Seroprevalences of brucellosis, Q-fever and toxoplasmosis in slaughter livestock in Trinidad

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Key words

Summary
Serum samples obtained from livestock (cattle, chickens, pigs, sheep, goats and water buffaloes) slaughtered at various slaughter houses in Trinidad were screened for agglutinins to three zoonosis causing pathogens. Of a total of 751 sera tested, 2 (0.3%) originating from chickens were positive for Brucella abortus agglutinins using the Rose Bengal test (RBT), but both were negative by the tube serum agglutination test (SAT). Thirty-six (4.8%) of 749 sera were positive for Coxiella burnetii agglutinins by the capillary agglutination test (CAT) with the highest prevalence, 11.3%, detected in pig sera and the lowest, 0%, found in sheep and goat sera. The difference was not statistically significant (P > 0.05; χ²). Of the 131 sera tested, 26 (19.8%) contained Toxoplasma gondii agglutinins with prevalences ranging from 5.5% in pigs to 42.9% in goats. It was concluded that livestock in Trinidad are free of B. abortus infections, but C. burnetii and T. gondii infections exist and are being documented for the first time in the island.

INTRODUCTION
Livestock are well known sources of important zoonoses which infect humans either through direct contact or by the consumption of their contaminated products (3, 4, 7, 8, 16, 17).

Although studies in other countries have determined the prevalence of several diseases, particularly zoonoses such as brucellosis, toxoplasmosis and Q-fever (14, 20, 22, 23), there is a dearth of information on the status of these infections in livestock in Trinidad. Cazabon (11) detected Brucella abortus agglutinins in a serum sample obtained from cattle over two decades ago in Trinidad while B. ovis agglutinins were detected in some sheep imported into Trinidad from Grenada in 1992 (10). There is therefore a need to monitor livestock for important infectious agents.

The present study was conducted to determine the seroprevalences of Brucella abortus, Coxiella burnetii and Toxoplasma gondii in several livestock species using the abattoirs and slaughter houses as sample sources.

MATERIALS AND METHODS
Between October 1992 and October 1995, blood samples were collected into universal bottles without anti-coagulant during the slaughter of livestock at slaughter houses or abattoirs located in San Juan, Tunapuna and Port-of-Spain (table I). The sex of all various species animals was recorded at that time.

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Table I
Prevalence of agglutinins to Brucella abortus, Coxiella burnetii and Toxoplasma gondii in slaughter livestock

<table>
<thead>
<tr>
<th>Species</th>
<th>B. abortus</th>
<th>C. burnetii</th>
<th>T. gondii</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken</td>
<td>266/2 (0.8)</td>
<td>266/3 (1.1)</td>
<td>ND</td>
</tr>
<tr>
<td>Cattle</td>
<td>256/0 (0.0)</td>
<td>256/11 (4.3)</td>
<td>55/15 (27.3)</td>
</tr>
<tr>
<td>Pig</td>
<td>152/0 (0.0)</td>
<td>152/17 (11.3)</td>
<td>55/3 (5.5)</td>
</tr>
<tr>
<td>Buffalo</td>
<td>53/0 (0.0)</td>
<td>53/5 (9.4)</td>
<td>ND</td>
</tr>
<tr>
<td>Sheep</td>
<td>16/0 (0.0)</td>
<td>16/0 (0.0)</td>
<td>14/5 (35.7)</td>
</tr>
<tr>
<td>Goat</td>
<td>7/0 (0.0)</td>
<td>7/0 (0.0)</td>
<td>7/1 (42.9)</td>
</tr>
<tr>
<td>Total</td>
<td>752/2 (0.3)</td>
<td>749/36 (4.8)</td>
<td>131/26 (19.8)</td>
</tr>
</tbody>
</table>

( ) = Percent
1 The two samples were positive by RBT but negative by the serum agglutination test (SAT)
2 Samples positive only when undiluted
3 Eight samples were positive undiluted, 1 sample had a 1:2 titre, while 2 samples had a 1:4 titre
4 Sixteen samples were positive only when undiluted while 1 sample had a 1:2 titre
5 All samples were positive undiluted only
ND: not done
In addition, blood samples of chickens slaughtered at a roadside pluck shop in St. Augustine were collected. All clotted blood samples were kept at 4°C overnight and the sera, harvested following centrifugation, were stored at -20°C until needed.

To detect B. abortus agglutinins, the Rose Bengal test (RBT) was used in all screened sera. The RBT-positive samples were subjected to the serum agglutination test (SAT) as described earlier (21). The B. abortus SAT antigen and positive control sera were kindly provided by the Veterinary Diagnostic Laboratory (VDL), University of Iowa, Iowa, USA.

C. burnetii agglutinins were detected in sera by the use of the capillary agglutination test (CAT) described by Luoto (19). All samples were initially screened undiluted but all positive sera were subsequently diluted two-fold and retested. For all tests, positive and negative control sera, also provided with the CAT antigen by VDL, were used.

The card agglutination test was used to detect T. gondii agglutinins using test kits containing positive and negative control sera.

**RESULTS**

The prevalences of agglutinins to B. abortus, C. burnetii and T. gondii in slaughter livestock are shown in Table 1. Of the 751 serum samples tested, only 2 (0.3 %) were positive for B. abortus agglutinins using RBT but both were negative by SAT.

Thirty-six (4.8 %) of 749 and 26 (19.8 %) of 131 serum samples were positive for C. burnetii and T. gondii agglutinins, respectively.

The prevalence of T. gondii agglutinins was statistically significantly (P ≤ 0.001; \( \chi^2 \)) higher than that of B. abortus and C. burnetii agglutinins. C. burnetii agglutinins had the highest prevalence, 11.3 % (17 of 151), in pigs and the least prevalence, 0 %, in sheep (0 of 16) and goats (0 of 7) but the difference was not statistically significant (P ≥ 0.05; \( \chi^2 \)). Seroprevalences of toxoplasmosis in goats (42.9 %), sheep (35.7 %) and cattle (27.3 %) were significantly higher (P ≤ 0.05; \( \chi^2 \)) than was found in pigs (2.3 %). Sex of livestock and sample sources (abattoir or slaughter house) did not significantly affect the prevalences of agglutinins to B. abortus, C. burnetii and T. gondii (data not shown).

**DISCUSSION**

It was significant that all 751 samples tested were negative for B. abortus agglutinins using SAT although two samples were positive by RBT. The findings agree with published reports elsewhere of RBT-positive sera found to be SAT-negative (5, 15). The livestock population is free of brucellosis, as confirmed by SAT, the standard test (21) for detecting B. abortus infections. Cazabon (11), however, reported in 1978 having detected one positive bovine with a significant titre of B. abortus agglutinins. This study findings are in agreement with the results of studies on goats and sheep in the US Virgin Islands (6) and in livestock in Nigeria (5) where all samples were negative for B. abortus agglutinins using SAT. The need for a regular serological surveillance for brucellosis in countries like Trinidad and Tobago, which are free of brucellosis, cannot be overemphasized. Neither can the enforcement of strict regulations for livestock importation be ignored. The need for a regular serological surveillance for brucellosis-free, the need for a constant serological surveillance and enforcement of strict quarantine measures for selective importation of livestock cannot be overemphasized. It is important that both T. gondii and C. burnetii in Trinidad livestock have been documented for the first time. Both pathogens may impact on the health status of residents.

**Acknowledgement**

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**REFERENCES**


T. gondii et C. burnetii agglutinins in livestock


Résumé
Adesiyun A.A., Cazabon E.P.I. Séroprévalences de brucellose, fièvre Q et toxoplasmosese chez des animaux de boucherie à Trinidad

Des échantillons de sérum provenant de vaches, poules, porcs, moutons, chèvres et buffles abattus dans différents abattoirs de Trinidad ont été analysés pour la présence d’agglutinines de trois agents responsables de zoonoses, Brucella abortus (BA), Coxiella burnetii (CB) et Toxoplasma gondii (TG). Des 751 sérums testés, 2 (0,3 p. 100) provenant des poules étaient positifs pour BA par le test de Rose Bengal (RB), mais négatifs par le test de séroagglutination en tube (SAT). Trente six (4,8 p. 100) des 749 sérums étaient positifs pour CB par le test d’agglutination en tube capillaire (CAT) avec la plus forte prévalence (11,3 p. 100) observée chez les porcs et la plus faible, 0 p. 100, observée chez les chèvres et les moutons (différence non significative: P > 0,05; δ2). Des 131 sérums testés, 26 (19,8 p. 100) étaient positifs pour TG avec une prévalence allant de 5,5 p. 100 chez les porcs à 42,9 p. 100 chez les chèvres. En conclusion, les animaux d’élevage de Trinidad n’ont pas été infectés par B. abortus. En revanche, il est montré pour la première fois que les infections causées par Coxiella burnetii et Toxoplasma gondii étaient présentes sur l’île.


Resumen
Adesiyun A.A., Cazabon E.P.I. Seroprevalencias de brucelosis, fiebre Q y toxoplasmoses en ganado de matadero de Trinidad

Se obtuvieron muestras de suero de animales domésticos de producción (bovinos, aviar, caprinos, ovinos, caballos y búfalos de agua) sacrificados en varios mataderos de Trinidad y se examinaron con aglutininas de tres zoonosis. Se examinó un total de 751 sueros, de los cuales 2 (0,3 p. 100), ambos de origen aviar, fueron positivos para aglutininas de Brucella abortus mediante el Test de Rose Bengal, pero ambos fueron negativos usando el test de aglutinación serológica en tubo (SAT). Treinta y seis (4,8 p. 100) de los 749 sueros fueron positivos para Coxiella burnetii por aglutinación capilar (CAT), con la prevalencia más elevada, 11,3 p. 100, detectada en suero porcino y la más baja, 0 p. 100, en ovinos y caprinos. La diferencia no fue estadísticamente significativa (P > 0,05; δ2). De los 131 sueros examinados, 26 (19,8 p. 100) presentaron aglutininas de Toxoplasma gondii con una prevalencia que varió de 5,5 p. 100 en cerdos a 42,9 p. 100 en cabras. Se concluye que los animales domésticos de producción de Trinidad están libres de Brucella abortus, pero C. burnetii y T. gondii existen, y son reportadas por la primera vez en la isla.

Palabras clave: Animal de carne - Brucella abortus - Coxiella burnetii - Toxoplasma gondii - Suero - Prevalencia - Aglutinina - Matadero - Trinidad.