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Seroprevalence of Toxoplasma Gondii and Neospora Caninum Infection in Cattle in Grenada, West Indies

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Abstract

In view of the limited data on the seroprevalence of Toxoplasma gondii and Neospora caninum in the Caribbean region, this study aimed to estimate the seroprevalence of these parasites in cattle in Grenada, West Indies. In Total 148 serum samples were collected from the jugular veins of cattle from the six parishes in the country. The samples were surveyed for T. gondii and N. caninum antibody by an enzyme-linked immunosorbant assay (ELISA). The overall seroprevalence of T. gondii was 2.7

Index terms—

1 Introduction

oxoplasma gondii (T. gondii) is a zoonotic protozoan parasite causing infection in most warm blooded species of animals including humans (Dubey 2010). T. gondii causes major economic losses in livestock through abortions, stillbirths and neonatal losses (Dubey et al. 2007). Infection in humans and animals can occur by ingestion of T. gondii oocysts from cats which are the definitive hosts or by consuming raw uncooked meat containing T. gondii tissue cysts, which develop in infected animals (Dubey 2010). Cattle and other herbivorous animals contact the infection from grass and pastures contaminated with cats' feces (Jacek et al. 2007). In humans, T. gondii constitutes an important health problem in pregnant women because of the threat of fetal infection and in immunocompromized patients, aggravates existing pathological conditions (Jacek et al. 2007 The objective of this study was to estimate the seroprevalence for T. gondii and N. caninum in cattle in Grenada.

II.

2 Materials and Methods

For the present survey a 2 step (multistage cluster sampling) sampling procedure was adopted. Generally cattle herds in Grenada are small comprising 1-4 animals. In the first step, 35 herds consisting of 6% of (2500) estimated cattle population in Grenada, were selected randomly from all the six parishes in the country. All herds having less than 10 cattle were sampled. For a herd size greater than 10, 80% of the animals were sampled. A total of 148 cattle were sampled randomly. Two milliliter of blood from the jugular vein of each animal was obtained. Blood samples were centrifuged at 1500g for 15 minutes, and the serum was collected and stored at -20 0 C until tested for antibodies to T. gondii and N. caninum using commercial ELISA kits (IDvet France). ELISA was performed following the instruction of the manufacturer.

3 III.

4 Results

Out of 148 cattle tested 4 animals [2.7%, 95% confidence Interval (CI), 0.09% to 5.31%] were positive for T. gondii and 10 [6.8% 95% confidence interval (CI), 2.74% to 10.86%] for C. caninum.

Results are presented in table 1. The variation in seroprevalence of T. gondii between various countries may be attributed to the difference in the rate of contamination of the environment with oocysts from cat, the definitive

host and differences in management methods (Pet Gondim et al. 1999, Jacek et al. 2007). The low prevalence of T. gondii (2.7%) could be related to cattle production in Grenada. Cattle herds in Grenada are small compared to more intensely managed herds elsewhere in the world. Small herds get better hygienic conditions and are in less contact with infected cats. Further studies regarding the differences between management practices for cattle in Grenada could potentially shed more light on this topic. This is the first report of N. caninum surveillance in cattle in Grenada. Antibodies to N. caninum was low [6.8%; 95% CI, 2.74% to 10.86%] in the tested cattle. Low prevalence has also been reported in Germany 4.1% **??**Conraths et al.1996), Canada 8.3% (Vanleeuwen et al. 2006), and Serbia 15% (Kuruca et al. 2013).

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Variations in the seroprevalence of Neosporosis depending on the region, climate and type of serological tests have been reported (Dubey et al. 2007). This variation amongst the different countries and regions of the world may be attributed to risk factors like dog density, climatic factors and management practices on the farm. Climatic factors influence the sporulation and survival of oocysts (Rinaldi et al. 2005).

Variation in seroprevalence with respect to management practices could be attributed to the size of farm (Guimaraes et al. 2004; Rinaldi et al. 2005).

A positive relation between seropositivity of farm dogs and bovine neosporosis has been reported by previous researchers **??**Wouda et al.1999;Kacar et al. 2012)). Seroprevalence in cattle is lower where dogs are not present on the farm **??**Basso et al. 2001, Antony andWilliamson 2003). In Grenada seropositivity for N. caninum in dogs has been demonstrated to be low varying from 1.2% in owned dog to1.6% in stray dogs (unpublished data). This low seropositivity in dogs correlates well with the lower seropositivity in cattle (6.8%). [1]

Figure 1:

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Number of	Toxoplasma gondii		Neospora can
	Number	Percent positivity	Number of
cattle tested	positive		tested
148	4	2.7	148

IV. Discussion

In the present survey antibodies to T. gondii were detected in only 4 [2.7%, 95% CI, 0.09% to 5.31%] of the tested cattle. Chikweto et al. (2011) reported a seroprevalence of T. gondii (8.5%) in cattle using MAT. In both surveys antibodies to T. gondii in cattle was low. Cattle are considered to be a poor host for T. gondii because of its relative natural resistance to this parasite (Dubey and Thulliez 1994, Pita Gondim et al, 1999, Dubey 2010). Similar to our observations in Grenada, low seroprevalence has been reported from Iran1.6% (Raeghi et al. 2011 and 0% by Sharif et al. 2007) India 2.4% (Sharma et al 2008) Brazil 1.03% (Pita Gondim et al. 1999), USA 3.2% (Dubey 1985) and Malaysia 6.3% (Chandrawathani et al 2008). However, a high seroprevalence of T. gondii in cattle has been reported from many countries of the world; 32% in Sudan (Khalil and Elrayach, 2011); Tenter et al. (2000) in their paper reported 22% in the Czech Republic, 40% in Greece, 13-43% in Netherlands, 43% in Portugal, 40% in Spain, 69% in France, 92% in Italy and 66% in Turkey. Jacek et al. 2007 found 53% seroprevalence in Poland.

Figure 2: Table 1 :

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