

# Seroprevalence of *Toxoplasma gondii* infection in swine matrices in Nova Mutum and Diamantino, Mato Grosso, Brazil

Soroprevalência de infecção por *Toxoplasma gondii* em matrizes suínas em Nova Mutum e Diamantino, Mato Grosso, Brasil

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## Abstract

This report aimed to assess the seroprevalence of *Toxoplasma gondii* infection in 708 swine matrices in Nova Mutum and Diamantino in the state of Mato Grosso, Central-West Brazil. Serum samples were examined by indirect fluorescent antibody test (IFAT). It was found a seroprevalence of 12.8%, considering titers  $\geq 64$ . Therefore, the data reinforce the need for appropriate management of swine raising to minimize the risk of infection of pigs with *T. gondii*.

**Keywords:** *Toxoplasma gondii*, swine, serology.

## Resumo

No presente trabalho, objetivou-se avaliar a soroprevalência da infecção por *Toxoplasma gondii*, em 708 matrizes suínas dos municípios de Nova Mutum e Diamantino do Estado de Mato Grosso, Brasil. As amostras de soro foram examinadas por meio da reação de imunofluorescência indireta (RIFI). Foi encontrada a frequência de 12,8% de soros positivos, com diluições iguais ou superiores a 64. Portanto, os dados obtidos reforçam a necessidade de um manejo de criação adequado, visando à minimização do risco de infecção de suínos por *T. gondii*.

**Palavras-chave:** *Toxoplasma gondii*, suínos, sorologia.

## Introduction

Toxoplasmosis is a worldwide zoonosis caused by *Toxoplasma gondii*, which has a wide range of hosts including mammals and birds. Pigs can acquire toxoplasmosis by ingesting water and food contaminated with oocysts present in feces of cats, rodents or meat infected with cysts and viscera, and by transplacental transmission (FRENKEL, 1990; WEIGEL et al., 1995).

Seroepidemiological studies of toxoplasmosis in pigs were carried out in several countries because of the importance this species has in the epidemiological chain. It is a major source of infection for humans when meat is eaten raw or undercooked (FERREIRA DIAS; FREIRE, 2005). The present study aimed to assess the seroprevalence of *Toxoplasma gondii* in sows.

## Material and Methods

Blood samples were collected from 708 sows from three commercial farms in Nova Mutum and Diamantino, state of Mato Grosso, Central-West Brazil. There were obtained 362 samples from Nova Mutum and 346 from Diamantino from females in reproductive activity. Blood samples were obtained by venipuncture of the jugular vein of the matrices. Sera were separated by centrifugation, put in microtubes properly identified and stored at  $-20^{\circ}\text{C}$  until serological analysis.

The sample size was estimated using Epi-Info version 3.5, with an estimated prevalence of 24% (GARCIA et al. 1999), an absolute precision of 5 and 95% confidence level, resulting in a significant epidemiologically sample. Serological tests were performed at the Laboratory of Toxoplasmosis, Instituto Oswaldo Cruz, in Rio de Janeiro, between March and May 2009. Sera were screened for IgG antibodies specific for *T. gondii* by indirect immunofluorescence assay (IFAT), according to the technique described by Camargo (1974) using hyperimmune

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serum anti-*T. gondii* IgG obtained commercially (Sigma®). In all reactions positive and negative standard sera were included. The antigen was obtained from peritoneal exudate of Swiss Webster mice (*Mus musculus*) infected with tachyzoites of RH strain of *T. gondii*. Sera from pigs were tested in sequential dilutions up to 1:1024. Titers greater than or equal to 64 were considered positive. The study was approved by the local Ethics Committee for Animal Research (CEPA).

## Results

The prevalence of anti-*Toxoplasma gondii* in sows obtained using IFAT was 12.8% (91/708), with 7.6% (54/708) at 1:64, 4.8% (34/708) at 1:256, and 0.4% (3/708) at 1:1024 (Table 1).

However, the separate analysis of data showed great difference between the two cities studied. Nova Mutum showed a prevalence of 22.9% (83/362), with 13.0% (47/362) at 1:64, 9.1% (33/362) at 1:256, and 0.8% (3/362) at 1:1024. The prevalence in Diamantino was extremely lower (2.3%) than that in Nova Mutum, with 2.0% (7/346) at 1:64, and only 0.3% (1/346) at 1:256 with no titers detected at other dilutions (Table 2).

## Discussion

Several authors have reported similar seroprevalence of *T. gondii* infection (15.35%) in the state of Paraná, Southern Brazil (TSUTSUI et al., 2003). However, the prevalence found in this study was lower when compared with results of other authors in several Brazilian regions: 29.72% (BARCI et al., 1998) in São Paulo; 37.84% of positive animals and 46.2% in matrices (VIDOTTO et al., 1990) and 24% (GARCIA et al., 1999) in Paraná, and 33.75% in Rio Grande do Sul (FIALHO; ARAÚJO, 2003).

In a study with swine slaughtered in Paraná, Carletti et al. (2005) reported 20.69% positive matrices and only 2.6% in terminal animals. The author claims this difference can be explained by greater stay of these animals in farms, where they are exposed to risk factors for a longer time.

**Table 1.** Serologic toxoplasmosis prevalence by IFAT in swine matrices.

	Positive				Negative	Total
	64	256	1024	Total		
Number of animals (%)	54 (7.6%)	34 (4.8%)	3 (0.4%)	91 (12.8%)	617 (87.2%)	708

**Table 2.** Serologic toxoplasmosis prevalence by IFAT in swine matrices in Nova Mutum and Diamantino, Central-West Brazil.

	Positive				Negative	Total
	64	256	1024	Total		
Nova Mutum	47 (13.0%)	33 (9.1%)	3 (0.8%)	83 (22.9%)	279 (77.1%)	362
Diamantino	7 (2.0%)	1 (0.3%)	0	8 (2.3%)	338 (97.7%)	346

Seropositivity of 2.3 % were found among terminal and 15.3% among breeding animals in a study including 47 properties Weigel et al. (1999). Also, Araújo et al. (1998) showed a 6.58 times chance of having anti-*T. gondii* if the animal is over the age of 12 months, and Garcia et al. (1999) reported a 2.26 times greater chance of positivity in animals over one year old.

Therefore, these data reinforce the need for appropriate management of swine raising in order to minimize risk of infection of swine by *T. gondii* since these animals are considered sources of *T. gondii* infection in humans, through the consumption of meat and sausages and direct handling of these animals and their carcasses by butchers and store employees.

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