



Seroprevalance Of *Toxoplasma Gondii* Infection In Market Weight Pigs From Crystal Springs, MS

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Abstract

Pigs are considered an important meat source for *Toxoplasma gondii*. They may be infected directly by ingestion of oocysts-contaminated feed, water, and soil, or by consumption of infected rodents. *T. gondii* infection in food-producing animals is a potential public health problem because the infection can be transmitted to human beings through handling and consumption of raw or uncooked meat that contains *T. gondii* bradyzoites encysted in muscle tissue. Among human beings, immunocompromised individuals and fetuses have the greatest risk for developing clinical toxoplasmosis. The complications of congenital toxoplasmosis include perinatal mortality, low birth weight, blindness, hearing loss, and the development of mental and motor disabilities during childhood. Toxoplasmosis is of common occurrence in AIDS patients and considered to be the immediate cause of death in about 3-10 percent of all AIDS patients. The objective of this study is to determine the prevalence of anti-*Toxoplasma gondii* antibodies in market weight pigs from Crystal Springs, Mississippi and to eventually extend it to other parts of Southwestern Mississippi. There is a need to carry out an in-depth study on the prevalence of porcine toxoplasmosis in Mississippi as literature review shows that little or no significant study of this kind has been done before. Between the months of April 2002 and July 2003, blood samples from pigs were collected from a slaughterhouse from Crystal Springs, MS (Wilson's Meat House). The blood samples were centrifuged, and the sera collected, labeled, and stored in the freezer at -20 degrees celsius until they were tested for *T. gondii* antibodies. Modified agglutination test (MAT) was performed at three different dilutions, namely, 1:25, 1:50, and 1:500. A titer at 1:25 was considered seropositive. Of a total of 824 samples tested, 439 (53.3%) were positive at a titer of 1:25; 353 (43%) at a titer of 1:50 and 308 (37.4%) at a titer of 1:500. The prevalence of *T. gondii* in pigs from Crystal Springs is fairly high compared to previous reports. The results indicate that all pork should be cooked thoroughly before human consumption.

Keywords: Seroprevalence, *Toxoplasma gondii*, Crystal Springs, Mississippi.

1.0 Introduction

Toxoplasma gondii was first discovered in 1908 in a desert rodent, the gondii, in a colony maintained at the Pasteur institute in Tunis (Roberts and Janovy Jr. 2000). Since then, the parasite has been found in almost every country in the world and in many species of carnivores, herbivores, insectivores, primates and other mammals. *Toxoplasma gondii* is widely prevalent in humans throughout the world yet

clinical toxoplasmosis is less common. It is clear that the most infections are asymptomatic or mild.

Several factors influence this phenomenon: the virulence of the strain of *Toxoplasma*, the susceptibility of the individual host and of the host species, the age of the host, and the degree of acquired immunity of the host. Pigs are more susceptible than mice. The definitive host is the cat, which sheds *T. gondii* oocysts in its feces.

Swine become infected by ingesting oocysts from the environment or by consuming raw meat that contains bradyzoites.

T. gondii infection in food-producing animals is a potential public health problem because the infection can be transmitted to human beings through handling and consumption of raw or undercooked meat that contains *T. gondii* bradyzoites. Testing for *T. gondii* antibodies will determine the prevalence of toxoplasmosis in swine, thereby relaying whether toxoplasmosis presents a public health concern. A review of literature shows studies on toxoplasmosis in pigs in several states in the nation but little or no work in Mississippi. (Gamble, Brady and Dubey 1999) The objective of this study is to serologically determine the prevalence of anti-*Toxoplasma gondii* antibodies in market weight pigs from Crystal Springs, MS (Figure 1A and B) and to eventually extend it to other areas in Southwestern Mississippi. The long-term goal is to implement control strategies to reduce *T. gondii* infection on swine farms in Mississippi and improve the image of pork as a safe food.

2.0 Materials and Methods

Blood samples were aseptically obtained from several different pigs at a slaughterhouse in Crystal Springs, MS (Wilson's Meat House) and refrigerated. The samples were centrifuged, and the sera collected, labeled, and stored at -20 degrees celsius until tested for *T. gondii* antibodies. Modified Direct Agglutination Test (MAT), as described by (Dubey and Desmonts 1987), was performed at three different dilutions, namely, 1:25, 1:50, and 1:500. A titer of 1:25 was considered seropositive.

3.0 Results

A total of 824 blood samples were collected from pigs from Crystal Springs, Copiah County in Mississippi and examined for toxoplasmosis. Of this number, 439 (53.3%) were positive at a titer of 1:25; 353 (43%) at a titer of 1:50 and 308 (37.4%) at a titer of 1:500 (Figure 2).

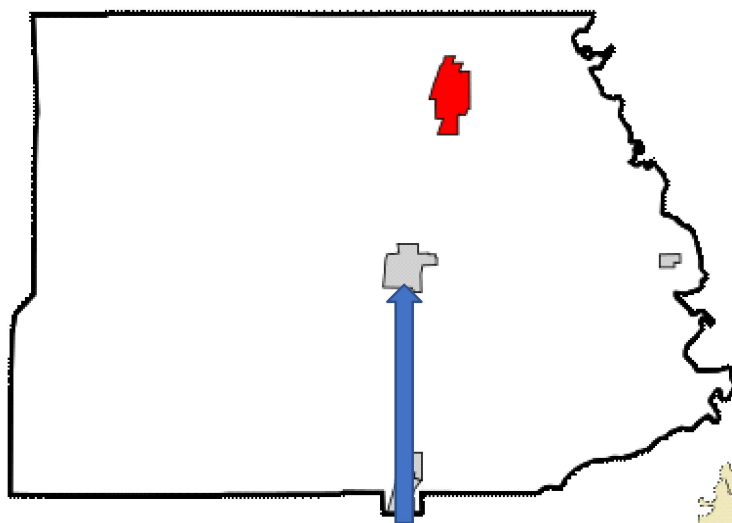


Figure 1A: Crystal Springs in Copiah County (enlarged picture).

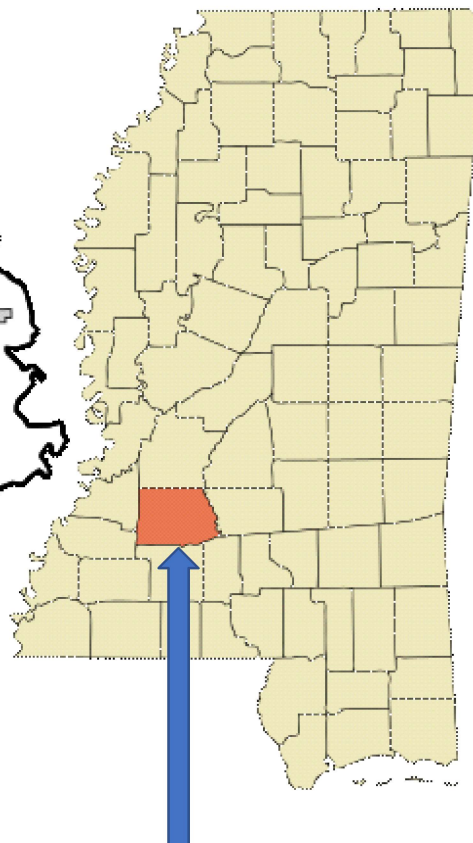
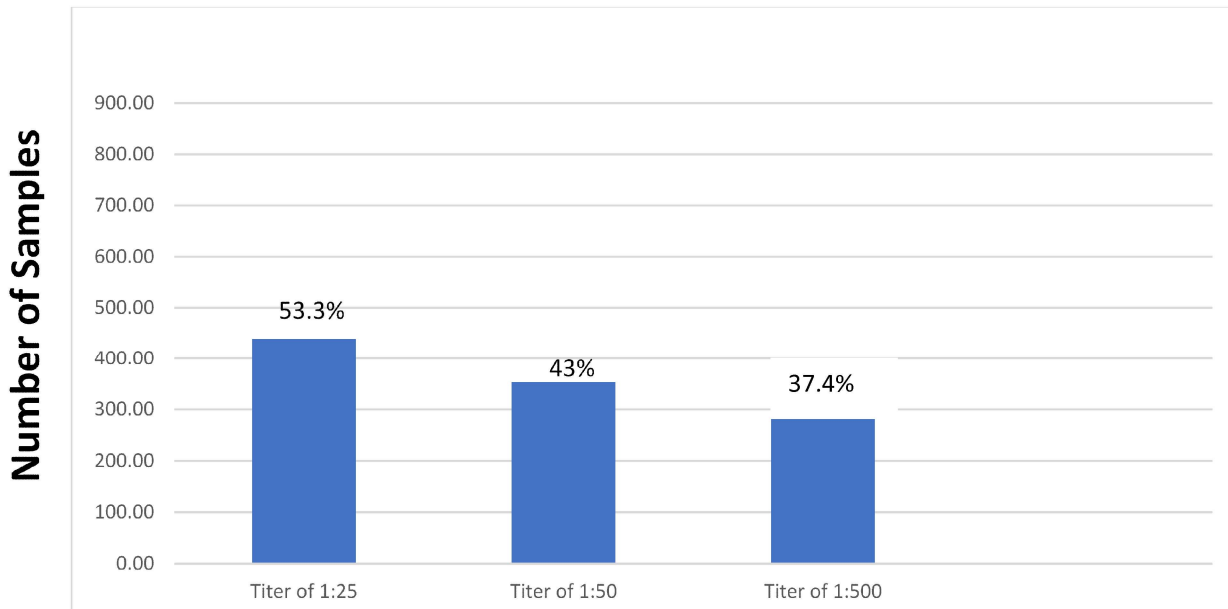


Figure 1B: Map of Mississippi showing Copiah County



Titer

Figure 2: Results of MAT of Blood Samples

4.0 Discussion

Toxoplasmosis is a potential public health concern because of its prevalence in pigs which is consumed a lot in the United States (Dubey and Beattie 1988). Various forms of pork are consumed by many in Mississippi where there are several pig farms (25.9 million- Global Ag Media), and slaughterhouses (about 88-Bradstreet Inc.). Raising pigs in a felid free environment will reduce the risk of *Toxoplasma gondii* infection. Conducting studies on anti-*T. gondii* antibodies will give additional insight into how serious toxoplasmosis is in the state of Mississippi and lead to the formulation of possible control strategies. It is estimated that nearly half of the adult human population in the United States unknowingly has anti-*T. gondii* antibodies (Dubey and Beattie 1988). It is evident that toxoplasmosis is a health problem in the U.S. and measures should be taken to reduce the risk of infection in humans as well as swine. From the results obtained from this study, it is apparent that *Toxoplasma gondii* infection is prevalent in pigs from Crystal Springs. The prevalence of toxoplasmosis in Crystal Springs pigs is in consonance with those reported from pigs from several other states in the nation. (Gamble et al.

1999 and Gamble and Patton (2000). Additional studies on the prevalence of *T. gondii* in the state of Mississippi are needed and recommended.

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