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# Seroprevalence of *Toxoplasma gondii* in Cattle, Punjab, Pakistan

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**Abstract:** The present investigation was carried out to determine the seroprevalence of *Toxoplasma gondii* in cattle at Jahangirabad cattle Farm in district Khanewal. A total of 200 serum samples were examined for the seroprevalence of *T. gondii* by using Latex Agglutination Test (LAT). Results of the present study showed that 87 cattle were found serpositive with percentage of 43.5. The relationship between sex of the host and parasite revealed that *T. gondii* is prevalent (47%) in female than male (39.5%). Age-wise prevalence of *T. gondii* showed that it had highest prevalence (49.2%) in age group of 3-47 months and prevalence (0%) in age group of 138-182 months. In conclusion the present investigation suggests that the *T. gondii* parasite is widely spread and may be the cause animal abortion in Punjab province of Pakistan.

**Key words:** Cattle · Toxoplasmosis · Prevalence · Age · Sex

## INTRODUCTION

*Toxoplasma gondii* belongs to the most widespread pathogenic protozoa. It affects large numbers of various species, including the domestic animals. The economic losses in toxoplasmosis are due to abortion and stillbirths, pneumonia and changes in the reproductive and neural systems of susceptible animals [1]. Infection in cattle does not usually show clinical symptoms since bovine have a high natural resistance to *T. gondii*. Little is known about infection with and the prevalence of *T. gondii* antibodies in dairy cows. The Toxoplasmosis can also be transmitted to humans by consuming infected meat and unpasteurized milk. The parasite can be transmitted directly or indirectly by animal-human contact or through contact with contaminated faeces, soil or herbage and can also be transmitted through contaminated food or water [2].

Research was carried out on the prevalence of *T. gondii* in various parts of the world including Pakistan [3-5] but no work has been done in Khanewal. The objective of this work was to study the seroprevalence of cattle toxoplasmosis including the relationship between age and sex.

## MATERIALS AND METHODS

The present study was under taken to determine the seroprevalence of *T. gondii* in cattle. A total of 200 cattle of both sexes, with the age of 3-182 months were studied from Jahangirabad cattle Farm in district Khanewal of Punjab province.

**Blood Collection:** The blood sample (3-5 ml) was collected from the jugular vein of each animal in vacuum tubes without anticoagulant. All the blood samples were labeled with the animal description (age, sex) and the date of collection. The samples were left for one hour for blood clotting and centrifuged. The sera were stored at –20°C until analysis. Repeated freezing and thawing was avoided.

**Serological Analysis:** The commercial "Toxoplasmosis Latex Kit" (Taytec Diagnostic Product, Canada) was used. The LAT was performed according to the manufacturer's instructions. Samples and reagents were brought to room temperature, after shaking the Toxo latex reagent. 40 µl of undiluted serums were placed on the slide black area. The latex reagent was mixed well and one drop was added

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to each serum drop. Both drops were mixed together with the aid of stirrer. Slide was rotate gently and slowly for 5 minutes according to the manufacturer's instructions. The presence or absence of agglutination was observed. The results are expressed in percentages. The prevalence for *T. gondii* was statistically analyzed using the Chi-square test ($\chi^2$) considering the variables sex and age.

## RESULTS AND DISCUSSION

**The Overall Prevalence of Toxoplasmosis in Cattle:** The results of the present study showed that out of 200 cattle, 87 were infected with *Toxoplasma gondii* showing the overall prevalence of 43.5%. Data on the seroprevalence in animals, show great variation, throughout the world, ranging virtually from 0% to 99% [6]. While lower values of 2.3, 2.4, 4.8, 10.7 and 19.88% were recorded by Yu *et al.* [7] in China, Sharma *et al.* [8] in India, Hamzavi *et al.* [9] in Iran, Ibrahim *et al.* [10] in Egypt, Lashari and Tasawar [5] in southern Punjab of Pakistan respectively. However, higher incidence rates of 49.4, 71.0 and 76.3% were recorded by Frazao *et al.* [11] in Brazil, Klun *et al.* [12] in Siberia respectively.

The differences in the prevalence could be attributed to difference in management of the farms, levels of natural immunity and sensitivity and specificity of the diagnostic test used [5, 13]. Prevalence of toxoplasmosis across the world is variable in different countries depending upon their customs, traditions, life styles of the inhabitants, weather conditions, age of the animals and husbandry practice [14]. The differences in the overall prevalence observed among different studies might have been due to differences in the diagnostic techniques used in the different regions, frequency of felines on the farms and the climatic variations from one region to another [15].

**The Relationship Between Sex and Toxoplasmosis:** In the present study, out of 89 male hosts, 35 were infected with *T. gondii*with the prevalence of 39.3%. In females, the prevalence was 47%. Thus, higher (P>0.05) prevalence was observed in females than in males (Table 1). It was suggested that female animals are more susceptible than males to infections of protozoan parasites [16] (Alexander and Stinson, 1988). The seroprevalence of *T. gondii* in Ghanaian female sheep and goats was significantly higher than those of males. Male sheep had an overall seroprevalence of 23.1% compared to 49.9% for female sheep [17].

Further studies were done in Satun province, Thailand and showed that female meat goats are more likely to be seropositive than males [18]. This finding is also similar to research of Pita *et al.* [19] in Brazil and is adverse to research of Silva *et al.*, Lashari and Tasawar [5, 20] in Brazil and Pakistan respectively, indicating that bull and ram were more seropositive. Alexander and Stinson [16], indicated that females have more immunity than males, which may be due to the presence of estrogen in females which normally increases the immunity, while androgen in males decreases the immunity. But there are various other factors which may break down the immunity in females e.g., changes in sex associated hormones, environmental factors, age, nutrition and pregnancy [21].

**The Relationship Between Age and Toxoplasmosis:** The relationship between age and cattle toxoplasmosis showed that the prevalence was highest (49.2%) in age group of 3-47 months and lowest (0%) in age group of 138-182 months (Table 2), the difference was statistically non significant (P>0.05). The results of this study also showed that cattle under the age of one year were more infected than the older cattle.

Table 1: The relationship between sex and toxoplasmosis in cattle

| | No. of hosts examined | No. of hosts infected | Prevalence (%) |
|---|---|---|---|
| Male hosts | 89 | 35 | 39.3 |
| Female hosts | 111 | 52 | 46.8 |

The difference was statistically non significant (P>0.05).

Table 2: The relationship between age and toxoplasmosis incattle

| Total No. of hosts examined | Age groups (months) | | | |
|---|---|---|---|---|
| | 3-47 | 48-92 | 93-137 | 138-182 |
| | n= 136 | n=32 | n= 31 | n=1 |
| 200 | 67(49.2) | 11(34.3) | 9(29) | 0(0) |

The values in parenthesis are in percentage. Difference was statistically non significant (P>0.05).

Vander-Puiji *et al.* [17] reported that age is an important factor in the prevalence of *T. gondii*in sheep. According to the results of the present study, the prevalence of *T. gondii*was higher in younger animals than adults. These results are supported by Yung, Pawelec *et al.* Jittapalapong *et al.* and Lashari and Tasawar [2, 5, 22, 23]. They further reported that the system of management and health practices have a significant effect on the incidence of blood borne parasites. It seems that the cattle deplete *Toxoplasma* antibodies as it age increase. In conclusion the results obtained showed the presence of *T. gondii* in both gender and the younger animals were more susceptible than adults.

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