

TOXOCARA VITULORUM INFESTATION AND ASSOCIATED RISK FACTORS IN CATTLE AND BUFFALO AT MULTAN DISTRICT, PAKISTAN

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ABSTRACT: *Toxocara (T) vitulorum* is a nematode, which resides in the small intestines of *Bubalus* and *Bos* species. The present study was conducted from January to March 2008 in Multan district, Pakistan to determine the prevalence of *T. vitulorum* in cattle and buffalo in relation with species, age and sex of the host. Small intestines of (n=282) buffalo were examined (n=180) were found positive and prevalence of *T. vitulorum* was recorded as 63.83% while intestines of cattle found positive (n=54) out of (n=144) and its prevalence was 37.50%. The data was analyzed statistically by using Chi-square and there was a significant difference ($P < 0.01$) in buffalo and cattle indicating that prevalence of *T. vitulorum* is species dependent. Cattle and buffalo were divided into three different age groups. In group A, cattle and buffalo were ≥ 1 year of age, in group B between 1-5 years of age and in group C ≤ 5 years of age. Prevalence of *T. vitulorum* was 72.09% (186/258) in group A, 18.18% (12/66) in group B while 35.29% (36/102) in group C. The results demonstrated the dependence of prevalence on age. While sex wise prevalence of *T. vitulorum* was recorded as 39.46% (90/228) in male and 72.72% (144/198) in female, and the results were highly significant ($X^2 15.77787$, $P < 0.01$) indicating that prevalence *T. vitulorum* is sex dependent.

Key words: Prevalence, *Toxocara vitulorum*, abattoir, Buffalo, Cattle, age, sex

INTRODUCTION

Toxocara (T) vitulorum, a nematode (round worm) of *Bubalus* and *Bos* species, founds mostly in tropical and subtropical climates throughout the world [1]. Its adults are 15-30 cm in length and resides in small intestines of the host [2, 3]. It mostly transmitted transplacentally and transclostral to calves while infection by water or feed is very rare [4, 5]. Calves start to shed eggs in their feces at 16- 23 days of age. The eggs that are shed in feces contain L1 stage larvae that develop into L3 larvae in 2-4 weeks. Eggs containing L3 do not hatch in the environment until they are ingested [2]. Larvae ingested by calves develop into adults in 3-4 weeks, and then begin shedding eggs in the feces [6]. A remarkable fact about *T. vitulorum* is that the adult worms are encountered principally in suckling calves. The dam sheds no *T. vitulorum* eggs even though she is the source of infection to the calves. This is because the larvae in the dam do not develop to adults but remain in third stage. When the cow is pregnant the larvae migrate from the liver to the mammary gland and prior to parturition, to the milk through which the calf is infected [2] *Toxocara vitulorum* is among the most destructive parasites of young ruminants because buffalo and bovine calves are the definitive hosts for *T. vitulorum*. An adult female *T. vitulorum* produces thousands of eggs daily. Egg fecundity ranges from 8000 to 100,000 eggs per gram (EPG) feces per day [2, 7]. These eggs pass out in the feces and under favorable conditions like adequate moisture and warm temperature support to become infective in two to three weeks. A thick protective shell of

eggs provides resistance against adverse environmental conditions such as chemical and physical insult, enabling eggs to remain infective for many years [8]. Consequently, infective eggs are abundant on pastures and other places that are contaminated with calf feces. When a host ingests infective stage eggs, the larvae hatch out in the intestinal tract and migrate to the liver, lungs and other tissues [9]. The larvae of *T. vitulorum* undergo migration that inflicts great damage to many organs, especially to the liver and the intestine. It is responsible for 11 to 50% mortality in calves of cattle and buffalo [10, 11]. Common clinical findings observed in infected calves include anorexia, abdominal pain, diarrhea or constipation, dehydration, weight loss or poor weight gain, and a butyric odor on the breath [7]. Uncommon sequel include intestinal obstruction or perforation and intussusceptions. Coughing has been described in experimentally infected calves. A significant number of infections are fatal. In adult cattle and buffalo, moderate experimental infections, probably comparable to natural infections, are asymptomatic. Ingestion of large number of eggs results in fever, diarrhea and coughing, while very large doses have resulted in paralysis, conjunctivitis and opisthotonos [12]. As Pakistan is located in the semi tropic zone so such type environment is conducive for *T. vitulorum*. This is one of the most common and economically significant problems of grazing animals. Unfortunately a little information is available about the infection rate and intensity of *T. vitulorum* in cattle and buffalo. The present study is an

Table I. Overall species wise prevalence of *Toxocara vitulorum*

Species	Infected animal (n)	Non-infected animal (n)	Infected animal (%)
Buffalo	180	102	63.83%
Cattle	54	90	37.50%

$\chi^2 = 8.897696$, ($P < 0.01$)

Table II. Species and Sex wise prevalence of *Toxocara vitulorum* in cattle and buffalo

Animal species	Male animals			Female animals		
	Infected animal (n)	Non-infected animal (n)	Infected animal (%)	Infected animal (n)	Non-infected animal (n)	Infected animal (%)
Buffalo	69	75	47.92%	111	27	80.43%
Cattle	21	63	25%	33	27	55%

$\chi^2 = 8.897696$, ($P < 0.01$)

Table III. Sex wise prevalence of *Toxocara vitulorum*

Sex	Infected animal (n)	Non-infected animal (n)	Infected animal (%)
Male	93	136	34.46%
Female	141	54	71.72%

$\chi^2 = 15.77787$, ($P < 0.01$)

Table IV. Age wise prevalence of *Toxocara vitulorum*

Age groups	Infected animal (n)	Non-infected animal (n)	Infected animal (%)
< 1 year	183	70	70.09%
years	14	51	16.18%
> 5 year	35	63	32.29%

$\chi^2 = 1$

abattoir based research focusing on the effect of sex and age of the host on the prevalence of *T. vitulorum* in large ruminants.

MATERIALS AND METHODS

Gastro-Intestine Tract (GIT) of 426 large ruminants (Cattle and Buffalo) slaughtered at Multan abattoir was examined from January to March 2008 for the presence of adult *T. vitulorum* (Fig 1). Animals were divided into various groups on the basis of age. In group A, cattle and buffalo were ≥ 1 year of age, in group B between 1-5 years of age and in group C ≤ 5 years of age (Fig 2). Among these animals (n=426), cattle (n=144) comprising of 84 males and 60 females while buffaloes (n=282) comprising of 144 males and 138 females (Fig 3). The worms were collected with the help of forceps and put into normal saline, then, transferred into wide mouthed screw capped glass bottle containing 10% formalin as preservative [13]. The bottles were properly labeled with necessary information about animals (species, age, sex etc). The adult worms were identified based on the characteristics given by Soulsby [14]. In order to see the magnitude of difference in the prevalence of *T. vitulorum* among cattle and buffalo, the data were analyzed statistically by using Chi-square test [15].

RESULTS

The study revealed that 234 animals out of 426 were infected with *T. vitulorum* and overall prevalence was 54.93%. The small intestines of 144 cattle were examined,

54 were positive for *T. vitulorum* infestation showing was 37.50% while 180 out of 282 buffaloes were positive for parasite and prevalence of *T. vitulorum* infestation was 63.83% (Table I). Species wise prevalence of *T. vitulorum* infestation was 47.45% (96/144) and 80.43% (111/138) in male and female buffaloes, respectively. While in cattle, the prevalence was recorded 25% (21/84) in male animals and 55% (33/60) in female animals (Table II). Prevalence of *T. vitulorum* infestation in male animals was 39.46% (90/228) while in female was 72.72% (144/198) as shown in table III.

The cattle and buffaloes were divided into three different age groups; group A: cattle and buffalo were ≥ 1 year of age, group B: between 1-5 years of age and in group C ≤ 5 years of age (Table IV). Prevalence of *T. vitulorum* was 72.09% (62/86), 18.18% (04/22) and 35.29% (12/34) in group A, group B and in group C respectively (Table IV). 70.983, ($P < 0.01$)

DISCUSSION

The results of present study revealed an overall infection rate of *T. vitulorum* in large ruminants as 54.93%. These results are in accordance with the findings of Barbosa and Corea, 1989, [16]; they studied the natural parasitism of *T. vitulorum* in buffaloes in Brazil and reported its prevalence as 52.1%. Similarly research conducted in Pakistan [17] and reported the infection rate of *T. vitulorum* in large ruminants as 33% in Tandojam town and its surroundings and similar studies showing infestation of buffalo and cow calves with *T. vitulorum* has also been recorded as 20-22% throughout the Punjab province [18]. In present survey, prevalence of *T. vitulorum* was recorded to be highest in buffalo. There was a significant difference ($P < 0.01$) in buffalo and cattle indicating that prevalence of *T. vitulorum* is species dependent [19, 20].

The rate of helminthes infection in large ruminants varies from one region of the world to another. The difference in the prevalence of *T. vitulorum* among animals of two species was highly significant [6, 9]. The buffalo is the definitive host of *T. vitulorum* [21]; therefore, prevalence of *T. vitulorum* is more in buffalo than that of cattle as supported by studies of many researchers [20, 22 and 23]. In this study female animals have more burden of *T.*

vitulorum ($P < 0.01$), this observation is an agreement with [8, 23, 24, 25 and 26]. Higher prevalence of nematodal infection in female animals as compared with male animals might be due to lowered resistance of female animals on the part of their reproductive events and insufficient/unbalanced diet against higher needs [27, 28, 29, 30 and 31]. The higher infection in young animals then that in older age animals may be attributed to their lesser resistance or lesser exposure to different species of helminthes compared with the older animal. Most of the researchers have observed higher rate of nematode infection/worm burden in young animals as compared with old animals [31, 32, 33 and 34].

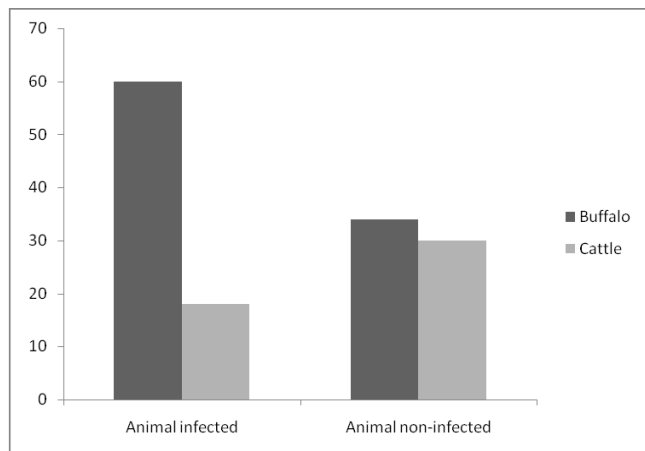


Fig 1: Species-wise prevalence of *Toxocara vitulorum*

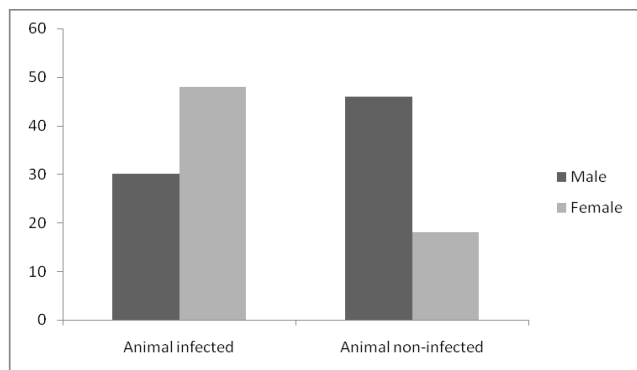


Fig 2: Sex-wise prevalence of *Toxocara vitulorum*

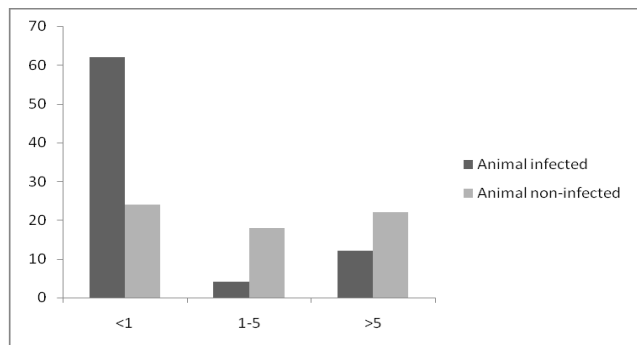


Fig 3: Age-wise prevalence of *Toxocara vitulorum*

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