



## Original article

# Clinical and haematological study on water buffaloes (*Bubalus bubalis*) and crossbred cattle naturally infected with *Theileria annulata* in Sharkia province, Egypt

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## ABSTRACT

This study was conducted to investigate the clinical and haematological findings in water buffaloes and crossbred cattle naturally infected with *Theileria annulata* with special reference to the clinical picture of tropical theileriosis in Egyptian buffaloes. A total 50 field cases of buffaloes and cattle was clinically and laboratory investigated from March to June 2008. Forty-four buffaloes and cattle out of 50 were naturally infected with *T. annulata* and showed typical signs of infection. Six animals showed no clinical signs and were free from external, internal, and blood parasites. The clinical findings of examined cattle and buffaloes showed typical signs of tropical theileriosis: fever, enlargement of the superficial lymph nodes, severe lacrimation, bilateral conjunctivitis, photophobia, and corneal opacity. It was clear that the severity of clinical signs in infected buffaloes was more prominent than in infected cattle with persistence of some lesions after recovery as corneal opacity and pulmonary lesions. Haematological analysis revealed a significant decrease in RBCs count, PCV%, haemoglobin amount, and WBCs in the infected animals when compared to the control group.

It was concluded from our study that *T. annulata* infection is associated with impairment and alteration of blood parameters in both cattle and water buffaloes. Theileriosis in water buffaloes might cause irreversible ocular changes that could lead to complete blindness. Data obtained in this study might be the basis for subsequent studies under natural and experimental field conditions.

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## Introduction

Bovine tropical theileriosis is a tick-borne disease caused by the protozoan parasite *Theileria annulata* transmitted by ticks of the genus *Hyalomma* (Brown, 1997). The disease causes heavy economic losses due to high morbidity and mortality rates as well as reduced production in recovered animals (Brown, 1990). The disease acts as a major constraint on livestock production in many developing countries with over 250 million cattle worldwide under risk of infection (Dolan, 1989).

In Egypt, the disease is considered to be one of the most destructive obstacles to livestock production (Al-Gaabary, 1995).

*Hyalomma a. anatolicum* is the most prominent tick species in domestic animals, and it is the tick species which serves as a vector of Mediterranean theileriosis under natural conditions in Egypt (Abdel-Rahman et al., 1989). The diagnosis of theileriosis in acute cases is mainly based on clinical findings and microscopic examination of Giemsa-stained thin blood and lymph node smears. However, expertise in piroplasm microscopy is required in subclinical or chronic infections because parasitaemias are often extremely low and may otherwise be missed (Aktas et al., 2006). The disease and its severity not only depend on the virulence of the causative agent, but also to a large extent on the degree of host susceptibility, which largely depends on the breed. In the present study, we report an investigation to ascertain the changes in some haemogram parameters as a result of *T. annulata* infection in buffaloes and cattle, and we describe the clinical picture of natural infection with *T. annulata* in water buffaloes and crossbred cattle from Egypt. These studies will hold contribute to a better understanding of pathogenesis and supportive therapy of this disease.

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## Materials and methods

### Animals and sampling

Blood samples were collected from the jugular vein into EDTA-containing tubes from 50 animals (20 crossbred cattle and 30 water buffaloes) of both sexes, aged 2–5 years and originating from different villages: El-Aslogy, Shobk Basta and Tel Basta around Zagazig city, Sharkia province. These animals were divided into 2 groups; the diseased group ( $N=44$ ) which was examined at the Veterinary Teaching Hospital, Faculty of Veterinary Medicine, Zagazig University, during the period from March to June 2008 and resulted to have persistent fever, continuous lacrimation, and anorexia. The control group (3 cows and 3 buffaloes) was carefully examined clinically and parasitologically and found healthy and free from external, internal, and haemoparasites.

### Clinical examination

Forty-four cattle and buffaloes in this study were subjected to clinical examination. These animals showed various degrees of the characteristic clinical signs of tropical theileriosis like fever ( $>40^{\circ}\text{C}$ ), enlargement of the superficial lymph nodes (acute form), anorexia, pale or congestion of the visible mucous membranes, conjunctivitis, severe congestion of the eyes, excessive lacrimation, corneal opacity, respiratory signs from serous nasal discharge to cough, purulent nasal discharge, and dyspnoea (chronic form). They were also infested with ticks to various degrees. The control group ( $N=6$ ) was examined thoroughly for the presence of any abnormal clinical changes and external parasites like ticks and lice, and examined by different laboratory techniques such as direct smear, flotation, sedimentation and Barmen's techniques and blood film to confirm the absence of any internal and/or haemoparasites (Rosenberger, 1990).

### Microscopic examination

Thin blood films were prepared immediately after taking the blood samples directly from the ear vein in the field to allow these smears to air-dry. Then they were fixed with methanol for about 3–5 min and again allowed to air-dry. They were stained with Giemsa stain diluted down to 8% with distilled water for about 30–45 min. They were air-dried and examined with an Olympus microscope using oil immersion lens at  $\times 1000$  magnification (Kelly, 1984). Each blood film and at least 20 microscopic fields of each slide were examined twice before considered negative.

### Haemogram parameters

Approximately 5 ml of blood was taken from the jugular vein of all animals with a syringe containing EDTA. The blood samples were subjected to haematological analysis including red blood cells (RBCs), white blood cells (WBCs), haemoglobin concentration (Hb), packed cell volume (PCV), and differential leukocytic count: lymphocytes, monocytes, neutrophils, eosinophils, and basophils (Kelly, 1984; Coles, 1986).

### Statistical analysis

The obtained data were statistically analyzed by means of computer-based statistical program, SP55 (Borenstein et al., 1997). Differences between means were considered statistically significant when  $P \leq 0.05$ .



**Fig. 1.** A buffalo (A) and a crossbred cow (B) infected with tropical theileriosis showing a severe enlargement of the prescapular lymph node (3–4 times compared to normal size).

## Results

### Clinical findings

Buffaloes and cattle showing theilerial infection were suffering of rise in body temperature and enlargement of superficial lymph nodes, especially the prescapular and the prefemoral lymph nodes, reaching up to 3–4 times of their normal size (Fig. 1). Nasal discharges, cough and eye affection in the form of bilateral lacrimation, swelling of the eyelids, conjunctivitis, photophobia, and corneal opacity were observed (Fig. 2). Blood smears from the infected animals showed intra-erythrocytic piroplasms that were mainly in the form of signet ring appearance (Fig. 3). Meanwhile, the control group resulted to be clinically and laboratory healthy on clinical examination.



**Fig. 2.** Adult buffalo infected with tropical theileriosis showing severe conjunctivitis, lacrimation, photophobia, and corneal opacity.

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