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Short Communication

A Method for Accelerating the Maturation of *Toxocara cati* Eggs

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Abstract

Background: The effect of temperature and humidity on the maturation of *Toxocara cati* eggs in an in vitro system was investigated.
Methods: Suspensions of *Toxocara cati* eggs, with 5% formalin/saline or 2.5% formalin/ringer were prepared and maintained at 37 °C under 40% humidity or at 25 °C under 98% humidity for 3 weeks for egg development.
Results: The suspension sample mixed by 2.5% formalin/ringer and maintained at 25 ºC and 98% humidity could fully embryonate the eggs of *Toxocara cati* in 3 weeks.
Conclusion: The main advantage of this method is the increase of recovery and also reducing of the eggs maturation time.

Keywords: *Toxocariasis, Toxocara cati, Eggs maturation*

Introduction

Toxocara canis and *T. cati*, roundworms of dogs and cats, are zoonotic parasites, which contribute to visceral and ocular damages in humans especially in children (1, 2). Ingestion of the embryonated eggs of *Toxocara* initiates infection in both definitive and aberrant host (3). *Toxocara cati* is the common roundworm of cats. It is related to *T. canis*, the roundworm of dogs and, more distantly, to *T. leonina*e which occurs in cats and dogs (3).
Toxocara eggs are un-embryonated and non-infectious when passed in the feces of dogs and cats into the environment. The eggs of *Toxocara* are extremely resistant to chemical agents and it is assumed that they may survive in an appropriate environment for more than a year like the related nematodes, but they are quite sensitive to desiccation and temperatures above 37 °C (1). Within a period of 3 to 6 wk to several months, depending on soil type and climatic conditions such as temperature and humidity, *Toxocara* eggs develop to an infectious stage (1, 4). In many biological or diagnostic studies embryonated eggs and large number of second stage larvae of *Toxocara* species are needed.
Different substances, including formalin and sulfuric acid with different condition of temperature and humidity have been used to find an optimal system for *in vitro*

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development of *Toxocara* eggs (5-8). These systems need long time incubation of the samples and yield relatively low number of embryonated eggs.

In this study, considering the simultaneous effect of temperature and humidity, a novel method was used in order to accelerate and improve the maturation of *T. cati* eggs.

Materials and Methods

Eggs were extracted from the uteri of female *T. cati* worms. Two suspensions of *T. cati* eggs, having the same number of eggs, were prepared and maintained under different temperature and humidity conditions. The first suspension with 5% formalin/ saline was maintained at 37 °C under 40% humidity and the second with 2.5% formalin/ringer was kept at 25 °C under 9.8% humidity. Samples were monitored and oxygenated, using vacuum pump, every day for a total of 3 wk for development of eggs. At the end of 3 wk the numbers of larvae in two samples were carefully counted.

Results

In the first group including three samples with 5% formalin/saline at 37 °C under 40% humidity, only 46% of eggs were embryonated (Fig. 1), whereas in the second group including three samples with 2.5% formalin/ringer at 25 °C under 98% humidity, 93.3% of eggs were embryonated (Fig. 2).

Our findings demonstrated that an increase in humidity and decrease in temperature produced a rise in the number of developed eggs. The results indicated that suspension sample mixed by 2.5% formalin/ ringer and maintained at 25 ºC and 98% humidity could fully embryonate the eggs of *T. cati* within 3 wk.

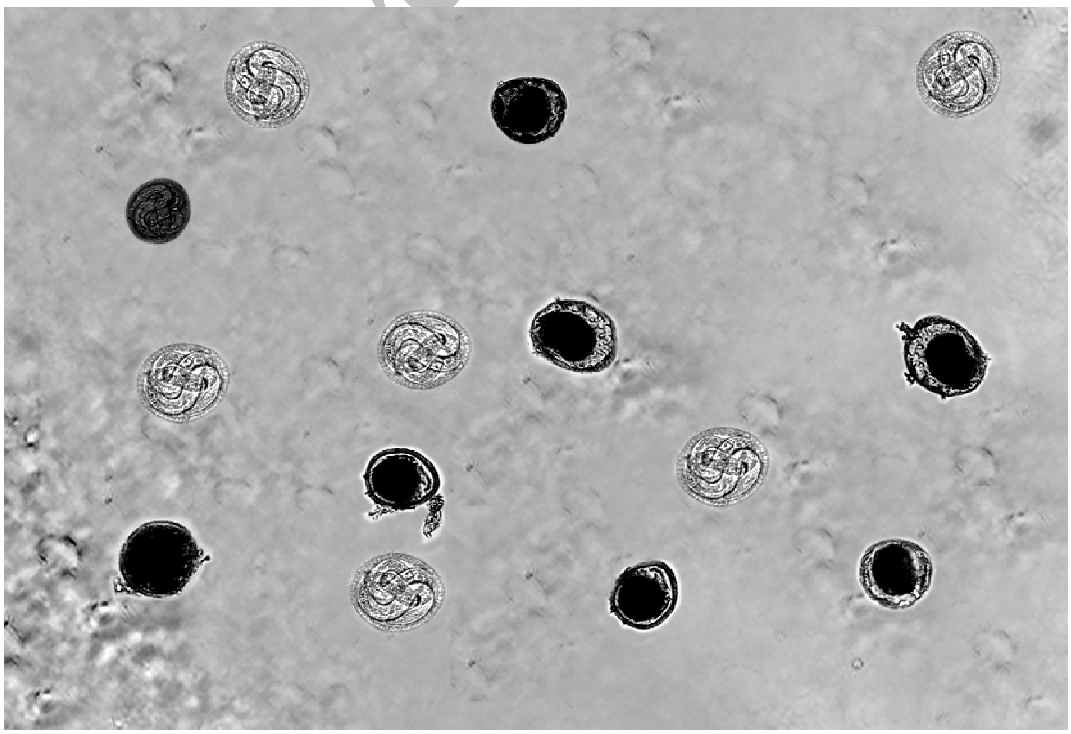

Fig. 1: Embryonated and unembryonated *Toxocara cati* eggs in 5% formalin/saline at 37°C under 40% humidity at the end of 3 weeks

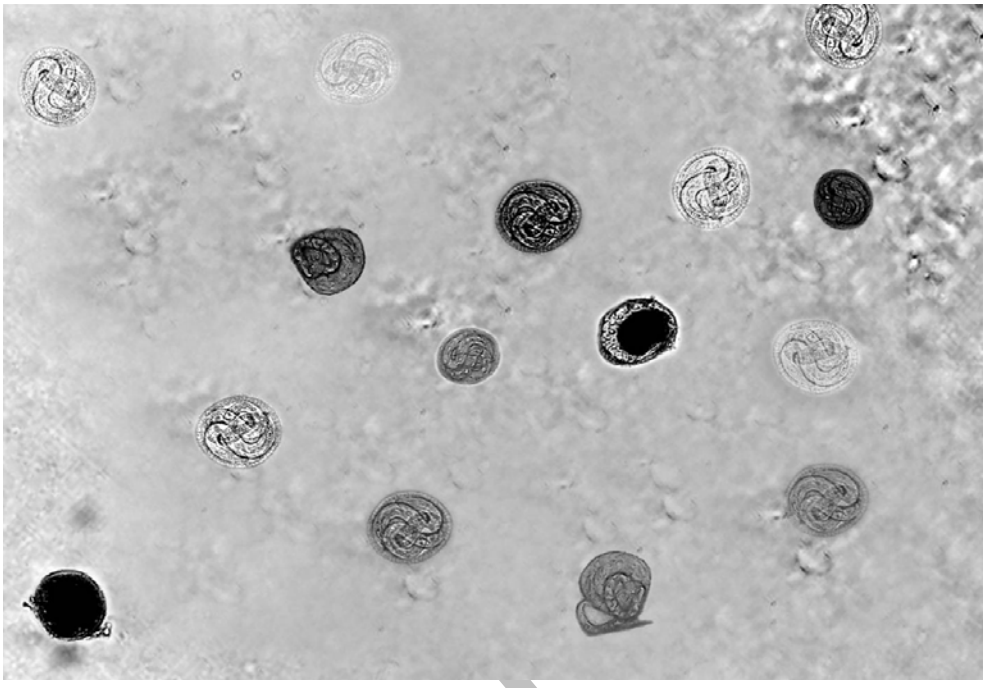

Fig. 2: Embryonated and unembryonated *Toxocara cati* eggs in 2.5% formalin/ringer at 25°C under 98% humidity at the end of 3 wk

Conclusion

The main advantage of the mentioned method is the increase of recovery and also reducing of the eggs maturation time. Using this novel system a large number of infective eggs and live larvae of *Toxocara cati* could be harvested for production of *Toxocara cati* excretory/ secretory antigens or larval antigens for different purposes.

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