

# Biomolecular investigation for *Capillaria* spp. infections on bronchoalveolar lavage fluid of owned domestic dogs presented for chronic cough in Belgium

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## Introduction

The trichuroid parasitic nematode *Capillaria aerophila* (syn. *Eucoleus aerophilus*) is responsible for lower respiratory infections and *Capillaria boehmi* (syn. *Eucoleus boehmi*) (Fig. 1) for sino-nasal infections in wild and domestic carnivores. Animals become infected by eating environmental embryonated eggs or earthworms. The adult worms live embedded in the epithelia of the bronchioles, bronchi, and trachea or in the nasal sinuses, respectively. Infections with *C. aerophila* can be sub-clinical or lead to chronic bronchial inflammation, rarely bronchopneumonia. *C. boehmi* may cause nasal discharge, sneezing or olfactory impairment.

**Objectives:** As knowledge about prevalence and distribution of both parasites beyond Eastern Europe and Mediterranean countries is limited, the aim of this study was to assess the prevalence of *C. aerophila* infection in coughing, client-owned, domestic dogs in Belgium.

## Materials

Stored bronchoalveolar lavage fluid (BALF) samples from 125 dogs (median age 7.3 years, range: 0.3-17.2 years) presented at the University of Liège between March 2018 and March 2022 were retrospectively used.

All dogs had history of chronic cough (> 2 weeks duration) and underwent BALF collection for microbiologic testing of common respiratory pathogens. DNA extracted from BALF samples was stored at -80°C until further analysis.

## Methods

A conventional polymerase chain reaction targeting a region internal to the *cox1* gene of *C. aerophila*, a Capillarinae consensus sequence, was performed on BALF samples in duplicate and in batch analysis using the following primers sequences. DNA of adult *C. boehmi* specimens was included as a positive control. Molecular grade water was used as a negative control.

Primer sequences	
Cox1NEMR	5-CCTGTTARRCCTCCRATACT-3
Cox1NEMF	5-CCTGAGGTTTATATTYTWRTT-3

Di Cesare et al., J Clin Microbiol 2012

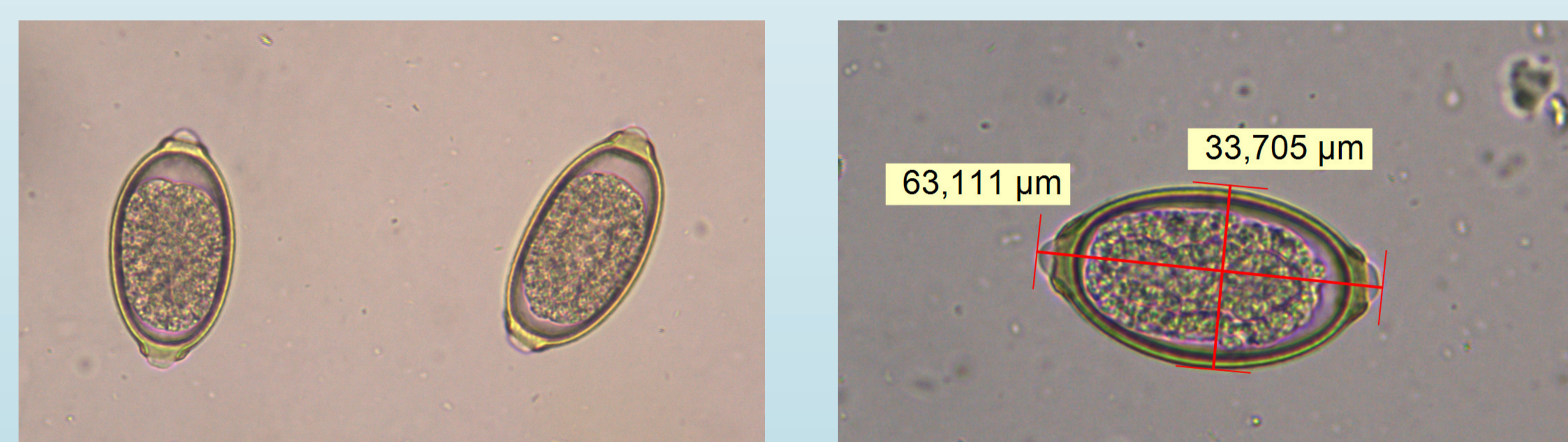


Figure 1: *Capillaria boehmi* eggs. Copyright: M. Schnyder, Institute of Parasitology, Zurich

## Results

Neither DNA of *C. aerophila* nor *C. boehmi* were detected in the BALF samples included resulting a prevalence of 0% (95% CI 0 – 2.4%).

Sixty-seven dogs (54%) had a recent history of deworming against lungworms with either moxidectin or fenbendazole (deworming protocol not standardized), 9 dogs (7%) were not up to date with deworming therapy, and the remaining 49 dogs (39%) had unknown deworming status.

Diagnosis of included dogs were primary infectious respiratory diseases (parasitic, bacterial, or mixed) in 39 (31%) dogs (7 dogs with angiostrongylosis and 4 dogs with *Crenosoma vulpis* infection), chronic bronchitis in 48 (38%) dogs, eosinophilic bronchopneumopathy in 25 (20%) dogs, tracheal hypoplasia in 2 (2%) dogs, laryngeal disease in 2 (2%) dogs, neoplasia in 1 dog, and undetermined in 8 (6%) dogs.

## Conclusions

Result of this study suggest that *Capillaria* spp. infection is absent, or present at a very low prevalence, in Belgian dogs with chronic cough. This might be explained by recent deworming therapy in half of the included dogs.

## Perspectives

Epidemiological surveillance of capillarid infection may be considered in wild canids, such as foxes, to determine whether these parasites are a potential risk for domestic animals.