MOLECULAR DETECTION OF *TRITRICHOMONAS FOETUS* IN CATS FROM ABRUZZO REGION (CENTRAL ITALY)

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INTRODUCTION. *Tritrichomonas foetus* (Trichomonadida, Tritrichomonadidae), is a protozoan parasite causing chronic diarrhea in domestic cats worldwide and it is transmitted through the fecal-oral route (Gookin et al., 2004). The clinical manifestations caused by *T. foetus* are variable, ranging from subclinical to severe. The infection is more frequent in catteries and shelters, and in purebred and young cats. A few studies have investigated the occurrence of *T. foetus* in Italy (Holliday et al., 2009; Mancianti et al., 2015; Veronesi et al., 2016; Sauda et al., 2019), thus there is a merit to provide novel information on its clinical and epizootiological significance in cat populations within the country. The present survey has investigated the occurrence of *T. foetus* in healthy and symptomatic cats from Italy with the aims to *i)* evaluate any association with overt enteric disease, *ii)* determine whether co-infections with other intestinal parasites affects presence and severity of clinical signs, and *iii)* identify possible risk factors.

METHODS. In 2019, individual faecal samples were collected from 105 cats (37 privately owned cats 68 colony-cats) referred at the University Veterinary Teaching Hospital of Teramo, Abruzzo region. The faecal samples were tested using a specific PCR protocol (Gookin et al., 2002). All samples were subjected also to concentration-floatation, sucrose gradient centrifugation and Baermann techniques for the detection of other endoparasites. The Fisher's exact test was performed to evaluate statistically significant associations ($p \leq 0.05$) between *T. foetus* infection and possible risk factors (i.e. age, sex, breed, housing, presence of other parasites and chronic gastrointestinal signs).

Monospecific infections	**n (%)**
Tritrichomonas foetus	16 (15.23%)
Aelurostrongylus abstrusus	8 (7.61%)
Toxocara cati	2 (1.90%)
Eucoleus aerophilus	1 (0.95%)
Dipylidium caninum	1 (0.95%)
Total	28 (26.66%)
Mixed infections	
Tritrichomonas foetus + Aelurostrongylus abstrusus	1 (0.95%)
Tritrichomonas foetus + Giardia	1 (0.95%)
Total	2 (1.90%)

Table 1. Number and percentage (in brackets) of monospecific and mixed infections in 105 cats.

RESULTS AND DISCUSSION. Thirty samples tested positive for at least one parasite (28.57%) at copromicroscopy (Table 1). In particular, one cat (0.95%) scored positive for *Giardia* oocysts, 2 for *Toxocara cati* (1.90%), 1 for *Eucoleus aerophilus* (syn. *Capillaria aerophila*) (0.95%), 9 for *Aelurostrongylus abstrusus* (8.57%) and 1 for *Dipylidium caninum* (0.95%). Eighteen of the 105 fecal samples (17.14%) scored positive for *T. foetus* specific DNA (Table 1). All 18 PCR amplicons were successfully sequenced yielding sequences of the expected length, that tested identical to each other. Comparative analysis with sequences currently available in GenBank showed ~100% homology with previously documented *T. foetus* isolates obtained from domestic cats in different European countries and North America (JX960422.1, EU569301.1). Chronic gastrointestinal signs were recorded in 22 cats (Table 2). Of them, 14 were privately owned in households and 8 in catteries/colonies. Overall, *Tritrichomonas foetus* was detected in 18/105 (17.14%) cats. The infection rate detected falls within the range published to date for Italy (0.75 – 32.4%) (Holliday et al., 2009; Mancianti et al., 2015; Veronesi et al., 2016; Sauda et al., 2019). Mixed infections were detected only in two cats, of which one was co-infected by *T. foetus* and *Giardia* and the other by *T. foetus* and *A. abstrusus,* thus a statistical analysis was not performed for co-infections. *Tritrichomonas foetus* was detected more frequently in cats with chronic gastrointestinal signs (38.9% *vs* 14.9%; $p = 0.01$; 95% CI = 1.40-13.99; OR = 4.27) and no other statistically significant associations emerged. Data obtained from this study indicate that *T. foetus* should be considered as a common cause of chronic enteropathy in cats, as suggested by past studies (Gookin et al., 2006, 2007; Arranz-Solís et al., 2016). The typical clinical sign is a chronic or intermittent large bowel diarrhea (Kuehner et al., 2011; Xenoulis et al., 2013). Overall, this study confirms the endemicity of *T. foetus* in cats from central Italy and its importance as a cause of chronic gastrointestinal signs. Moreover, the data here presented showed that the infection also occurs in adult and mixed-breed cats as previously reported (Doi et al., 2012; Gruffydd-Jones et al., 2013).

Variable		**N.**	**N. of *T. foetus* PCR +**	**p value**
Age	Young (<1 year)	**52**	**8**	**0.446**
	Adult (≥1 year)	**49**	**10**	
Sex	Male	**51**	**9**	**1.000**
	Female	**54**	**9**	
Breed	Purebred	**4**	**1**	**0.534**
	Mixed	**101**	**17**	
Housing	Indoor	**37**	**7**	**0.789**
	Outdoor	**68**	**11**	
Chronic gastrointestinal signs	Yes	**22**	**9**	**0.002***
	no	**83**	**9**	
Large bowel diarrhea	Yes	**8**	**2**	**0.623**
	no	**97**	**16**	

Table 2. Relationship between history, clinical and parasitological data and the molecular positivity for *Tritrichomonas foetus* in 105 cats. *Statistical significance ($p<0.05$). N. = number of cats

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