

# A RETROSPECTIVE ANALYSIS OF HOOKWORM INFECTION IN DOGS FROM SOUTHERN ITALY

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## INTRODUCTION

Hookworms (*Ancylostoma caninum* and *Uncinaria stenocephala*) are common helminths of dogs worldwide. These parasites have a significant prevalence in the canine population both in Europe and in Italy (Traversa et al., 2012; Brianti et al., 2018). The aim of this retrospective study was to estimate the prevalence of hookworm infection in owned dogs and examine trends with age, gender and breed size by reviewing the data from routine diagnostic activity performed at the Laboratory of Parasitology and Parasitic Diseases, Department of Veterinary Medicine and Animal Production, University of Napoli Federico II (PAR-UNINA).

## MATERIALS AND METHODS

The retrospective study included data (January 2009-March 2021) from the copromicroscopical examinations of owned dogs referred by veterinary practitioners from the Campania region to the PAR-UNINA labs. All the samples were tested by the FLOTAC technique (Fig.1) (Cringoli et al., 2010, 2011) using NaCl (specific gravity 1,200) as flotation solution and a detection limit of 2 eggs per gram (EPG) of faeces. The statistical analysis included Chi-Square tests and cross-tabulation to evaluate the association between the positivity for Ancylostomatidae and the anamnestic data (gender, age and breed size) (Tab.1).

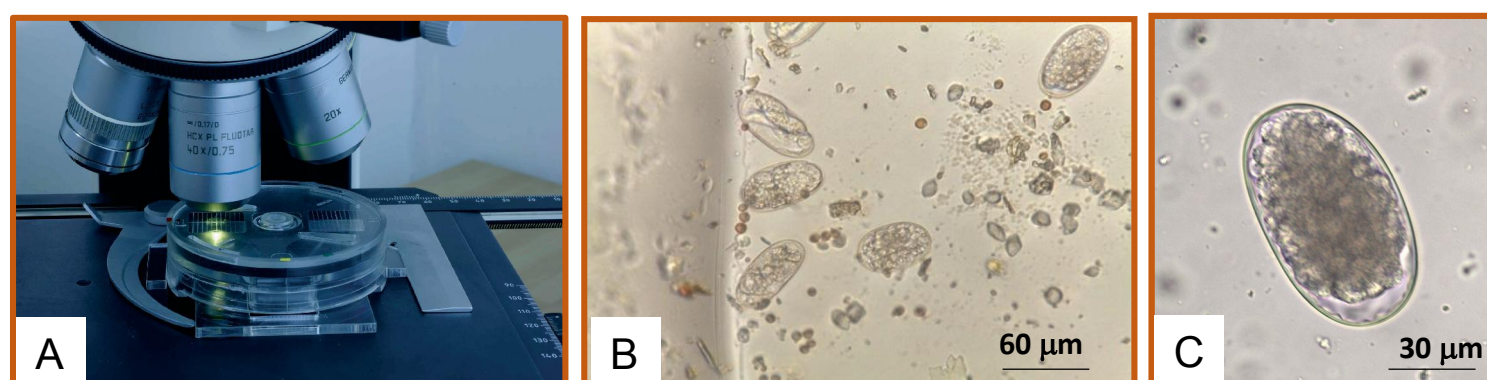


Fig.1 (A) the FLOTAC apparatus; (B,C) eggs of Ancylostomatidae (B = 100X; C = 400X)

Table 1. Anamnestic data (gender, age and breed size) of the dogs included in the study.

Gender		Age groups		Breed size	
Male	55.4%	1-24 months	63.4%	Small	26.9%
Female	44.6%	25-72 months	24.1%	Medium	55.9%
		≥73 months	12.5%	Large	17.2%
Total samples = 5,644					

## RESULTS AND CONCLUSIONS

The results showed an overall prevalence of 14.3% (804/5,644; 95%CI =13.4-15.2) for Ancylostomatidae with a mean EPG of 29.6 (min=2; max=556). The prevalence of dogs infected with Ancylostomatidae per year is reported in Tab. 2. Dogs in the age group 1-24 months (13.8%; 95%CI=12.7-15.0) showed significantly higher infection rates ( $p<0.05$ ) compared to older dogs. Moreover, there was a significant association ( $p<0.05$ ) between the positive dogs and the medium breed size group. No significant differences were found between the positive dogs and the gender ( $p>0.05$ ).

Table 2. The prevalence of dogs infected with Ancylostomatidae per year.

Year	Positive samples/total samples	Prevalence (%) (95% CI)
2009	118/817	14.4 (12.1-17.1)
2010	126/912	13.8 (11.7-16.3)
2011	110/846	13.0 (10.8-15.5)
2012	86/624	13.8 (11.2-16.8)
2013	78/604	12.9 (10.4-15.9)
2014	89/633	14.1 (11.5-17.1)
2015	39/250	15.6 (11.4-20.8)
2016	38/214	17.8 (13.0 - 23.7)
2017	42/220	19.1 (14.2-25.0)
2018	52/307	16.9 (13.0-21.7)
2019	20/152	13.2 (8.4- 19.8)
2020	2/34	5.9 (1.0-21.1)
2021	4/31	12.9 (4.2 - 30.8)
Total	804/5,644	14.3 (13.4-15.2)

Despite the availability of broad-spectrum anthelmintics, the present study showed that hookworm infections are still fairly common in dogs from the Campania region of southern Italy in line with the results from a nationwide survey on endoparasites of dogs in Italy (Brianti et al., 2018). Therefore, regular parasitological surveillance, appropriate treatment strategies and high-quality standard of hygiene are needed as recommended by the guidelines from ESCCAP ([www.esccap.org](http://www.esccap.org)). Further molecular studies are also needed to evaluate the occurrence of the zoonotic hookworm species *Ancylostoma caninum* in single and/or mixed infections with *Uncinaria stenocephala*.

**References:** Brianti E. et al., 2018. Italian nationwide survey on endoparasites of dogs. XXX Congresso Nazionale SolPa. 45-48. Cringoli G. et al., 2010. FLOTAC: new multivalent techniques for qualitative and quantitative copromicroscopic diagnosis of parasites in animals and humans. Nat Protoc, 5(3): 503-515. Cringoli G. et al., 2011. *Ancylostoma caninum*: Calibration and comparison of diagnostic accuracy of flotation in tube, McMaster and FLOTAC in faecal samples of dogs. Exp. Parasitol. 128 (1): 32.37. Traversa D., 2012. Pet roundworms and hookworms: a continuing need for global worming. Parasit Vectors. 5:91.