

Seroprevalence of dirofilariasis in dogs in Sukabumi Regency

Yusuf Ridwan^{1,*}, Etih Sudarnika², Abdul Zahid Ilyas²

¹ Division of Parasitology and Medical Entomology, School of Veterinary Medicine and Biomedical Sciences, IPB University, Bogor

² Division of Veterinary Public Health and Epidemiology, School of Veterinary Medicine and Biomedical Sciences, IPB University, Bogor

ABSTRACT: Dirofilariasis is a serious zoonotic disease in dogs. This study aimed to measure the prevalence and determine the risk factors of dirofilariasis in the Sukabumi Regency. A total of 152 blood samples were collected from dogs in two sub-districts in Sukabumi which have different topographic characteristics, namely Jampang Tengan District which is a hilly area, and Cisolok District which is a coastal area. Blood serum was examined using the commercial rapid test kit CHW Ag Test Kit 2.0 ® Bionote to detect the presence of the *Dirofilaria immitis* adult worm antigen. The results showed that the seroprevalence of dirofilariasis in dogs in the Sukabumi Regency was 20.4%. Areas with hilly characteristics have a higher prevalence of dirofilariasis than coastal areas do. The incidence of dirofilariasis in the Sukabumi Regency was not influenced by sex, method of keeping, or age of the dog.

Keywords:

dog, dirofilariasis, seroprevalence, risk factors, Sukabumi

■ INTRODUCTION

Dirofilariasis is a serious and potentially fatal disease in dogs caused by the nematode *Dirofilaria immitis* (*D. immitis*), with a very wide distribution throughout the world, including Indonesia (Dayanti *et al.* 2021). The clinical symptoms of dirofilariasis vary greatly, and include coughing, weight loss, fatigue, shortness of breath, ascites, heart rate abnormalities, and haemoglobinuria (Hoch & Strickland 2008). In addition to causing serious impacts on dog health, this disease also endangers human health because it is zoonotic.

The distribution of dirofilariasis is very wide and can be found worldwide, including Indonesia, with varying levels of prevalence. The prevalence of dirofilariasis in Indonesia has been reported to vary from 2.2-28.7% in several regions (Satrija *et al.* 2008, Assady *et al.* 2016, Erawan *et al.* 2017, Andiarsa *et al.* 2018). Climate change that has occurred in the last few decades can influence the incidence of diseases, including dirofilariasis. Therefore, it is necessary to conduct ongoing research to update the data on the spread of dirofilariasis. This paper presents the results of research related to the seroprevalence of dirofilariasis in dogs in the Sukabumi Regency, West Java, Indonesia.

■ MATERIALS AND METHODS

This cross-sectional study aimed to determine the seroprevalence of dirofilariasis in dogs in Sukabumi district. A total of 152 blood samples were collected from dogs in two sub-districts in Sukabumi Regency which have different topographies, namely Cisolok District with coastal topography, whereas Central Jampang is an area with hilly topography.

Serum collected from dog blood samples was tested using the commercial rapid test kit CHW Ag Test Kit 2.0 ® Bionote to detect the presence of *Dirofilaria immitis* adult worm antigen. Data related to factors that can influence the incidence of dirofilariasis were collected through interviews with questionnaires. The test kit test results and questionnaire results were analysed using chi-square test.

■ RESULTS AND DISCUSSION

The seroprevalence rate of dirofilariasis in dogs in Sukabumi in this study was 20.39% (31/152), which differs from that in several regions in Indonesia. The prevalence of dirofilariasis in Indonesia varies depending on the region, namely 2.2, 15.9, 4.5, and 8.8% in Jakarta, West Java, Central Java, and Bali, respectively (Satrija *et al.* 2008), 10% in Aceh (Assady *et al.* 2016), 14.6% in Yogyakarta (Erawan *et al.* 2017), and 28.7% and 21% in Central and South Kalimantan, respectively (Andiarsa *et al.* 2018). This difference in prevalence can be influenced by several factors, including geographic location which can cause differences in climate and environmental conditions, as well as vector populations (Yildirim *et al.* 2007).

The difference in prevalence between the Jampang Tengah and Cisolok sub-districts is thought to be related to differences in the environmental characteristics of the two locations which indirectly influences the mosquito population as a vector for *D. immitis* (Table 1). Another factor that could

Received: 03-11-2023 | Revised: 01-12-2023 | Accepted: 05-12-2023

© 2023 CC-BY-SA. This is an Open Access article that is distributed under the terms of *Creative Commons Attribution ShareAlike 4.0 International License* (<https://creativecommons.org/licenses/by-sa/4.0/>).

influence the differences in prevalence was the population density of dogs as the main host of *D. immitis* in the two study areas.

The results of this study showed no relationship between the prevalence of dirofilariasis and the sex of the dog. The influence of sex on the prevalence rate of worm infections is still a matter of debate because there are differences in research results which show no effect (Boonyapakorn *et al.* 2008, Satrija *et al.* 2008, Vieira *et al.* 2014, Erawan *et al.* 2017, Anvari *et al.* 2019), while some researchers reported the opposite: there is a relationship between the prevalence of dirofilariasis and the sex of the dog (Yildirim *et al.* 2007). Although there are differences, the prevalence rate of dirofilariasis is generally higher in males.

The results of the study showed that the prevalence of dirofilariasis was higher in dogs over one year of age, but the results of the analysis did not show a relationship between prevalence and dog age (Table 1). This research is in line with several studies showing that there is no relationship between age and prevalence of *D. immitis* (Anvari *et al.* 2019, Jalali *et al.* 2010). However, several studies have shown a close relationship between the prevalence of dirofilariasis and the age of dogs (Boonyapakorn *et al.* 2008, Satrija *et al.* 2008, Vieira *et al.* 2014). In general, the incidence of infection increases with increasing age of dogs, which plays an important role in the spread of dirofilariasis. The increase in prevalence at older ages is thought to be related to longer periods of contact with or exposure to mosquitoes in older dogs, resulting in a higher chance of infection.

Table 1 Seroprevalence of dirofilariasis in dogs according to location and demographics in the Sukabumi Regency.

Risk Factors	N	Infected		Chi-Square	
		n	%	X ²	P
Location	Jampang Tengah	85	26	30.59	12.34 0.00*
	Cisolok	67	5	7.46	
Sex	Male	100	21	21.00	0.07 0.79
	Female	52	10	19.23	
Age	Puppies (0-1 Yo)	88	15	17.05	1.44 0.23
	Adult (>1 Yo)	64	16	25.00	
Method of keeping	Released	132	26	19.70	0.30 0.58
	Grounded/tied	20	5	25.00	

*significant difference (P < 0.05).

The results showed that there was no association between prevalence and different maintenance methods (Table 1). There was no difference in the prevalence of dirofilariasis in caged and wild dogs, presumably because care is carried out outside the home, so they have the same chance of being bi-

tted by mosquitoes as the dirofilariasis vector. In general, dogs kept outside or in the wild have higher infection rates than those kept at home (Boonyapakorn *et al.* 2008, Satrija *et al.* 2008, Vieira *et al.* 2014, Anvari *et al.* 2019). Dogs that live outside or are kept in the wild have a high level of exposure to vectors; therefore, the chance of being bitten by mosquitoes is greater.

CONCLUSION

The seroprevalence of dirofilariasis in dogs at Sukabumi was 20.4%. The seroprevalence of dirofilariasis was higher in dogs in the hilly areas of Central Jampang than in those in the coastal area of Cisolok. The prevalence rate of dirofilariasis in Sukabumi is not influenced by sex, age, or how dogs are kept.

AUTHOR INFORMATION

Author for correspondence

*YR: yridwan@apps.ipb.ac.id.

Division of Parasitology and Medical Entomology, School of Veterinary Medicine and Biomedical Sciences, IPB University. Jln. Agathis, Kampus IPB Dramaga, Bogor, 16680, West Java of INDONESIA

REFERENCES

- Anvari A, Saadati D, Siyadatpanah A, Gholami S. 2019. Prevalence of dirofilariasis in shepherd and stray dogs in Iran Shahr, Southeast of Iran. *Journal of Parasit Diseases*. 43(2): 319–323.
- Andiarsa D, Hairani B, Fadilly A. 2018. *Brugia malayi* dan *Dirofilaria spp* sebagai penyebab filariasis pada hewan reservoir di daerah endemis di Kalimantan. *JHECDs: Journal of Health Epidemiology and Communicable Diseases* 4(1): 24–30.
- Assady M, Nazaruddin, Dwinna A, Hamdani, S Aisyah, Rosmaidar. 2016. Prevalensi dirofilariasis pada anjing lokal (*Canis domestica*) di Kecamatan Lhoknga Aceh Besar secara patologi anatomis. *Jurnal Medika Veterinaria*. 10(2): 109–111.
- Boonyapakorn C, Srikitjakarn L, Morakote N, Hoerchner F. 2008. The epidemiology of *Dirofilaria immitis* infection in outpatient dogs at Chiang Mai University Small Animal Hospital, Thailand. *Southeast Asian Journal Tropical Medicine and Public Health*. 39(1): 33–38.
- Erawan IGM, Tjahajati I, Nurcahyo W, Asmara W. 2017. Prevalence and risk factor of the *Dirofilaria immitis* infection in dogs slaughtered in Daerah Istimewa Yogyakarta. *Jurnal Veteriner*. 18(4): 541–546.
- Hoch H, Strickland K. 2008. Canine and Feline Dirofilariasis: life cycle, pathophysiology, and Diagnosis. *Compendium*. 30(3): 133–140.
- Jalali MR, Alborzi A, Avizeh R, Mosallanejad B. 2010. A study on *Dirofilaria immitis* in healthy urban dogs from Ahvaz, Iranian *Journal of Veterinary Research*. 11(4): 357–362.
- Satrija F, Ridwan Y, Wulandari N, Ming Y. 2008. Prevalensi dan faktor risiko infeksi cacing jantung (*Dirofilaria immitis*) pada anjing peliharaan di Jawa dan Bali. *Proceedings of KIVNAS*. Bogor, Indonesia, August 19th–22nd 2008.
- Vieira AL, Vieira MJ, Oliveira JM, Simoes AR, Diez-Banos P, Gestal J. 2014. Prevalence of canine heartworm (*Dirofilaria immitis*) disease in dogs of central Portugal. *Parasite*. 21(5): 1–7.
- Yildirim A, Ica A, Atalay O, Duzlu O, Inci A. 2007. Prevalence and epidemiological aspects of *Dirofilaria immitis* from Kayseri Province, Turkey. *Research in Veterinary Science*. 82(3): 358–363.