



OneHealth and Malagasy Dogs

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The Mad Dog Initiative in Andasibe, Madagascar

Funded by CHW/GHP, EEB, ODOC, PEI



Introduction

- Malagasy dogs (*Canis lupus familiaris*) can negatively impact biodiversity and human health by preying on wildlife and serving as a vector of rabies and zoonotic diseases.
- Despite man's proximity to dogs, the implications of Malagasy dog interactions with humans and their environments are not well defined in current literature.

Objectives

Observing OneHealth in action in order to develop a deeper understanding of the Malagasy dogs interactions was the key focus of this research project—field work offers more context for the thesis. In addition, I sought to collect more blood samples for the laboratory component.



Figure 1. OneHealth looks at the different interactions between animal, human, and environmental health.



Figure 2. Field laboratory set up in Andasibe with blood smears, WITNESS heartworm tests, and filter paper saturated with blood.

Methods

- Noted demographic information: weight, temperature, heart rate, respiratory rate, CRT/MM, lesions, any conditions.
- Collected additional blood samples on TropBio filter paper for later genetic sequencing alongside older primary blood samples from Ranomafana.

Results

- Dogs are vectors of rabies, which causes approximately 60,000 human deaths annually—Madagascar has a relatively high burden of disease, which made the vaccination campaign important.
- The mobile clinic, staffed with Malagasy and foreign veterinarians, also spayed/neutered dogs in order to control population.



Figure 4. Toto came in with a severe case of sarcoptic mange and was malnourished. She was vaccinated, spayed, and treated for her condition.

- Village nutrition surveys showed that families that could hardly afford food often left dogs to fend for themselves.
- These dogs would often roam into the rainforest—lemur transect surveys showed a disruption in habitat and range.



Figure 6. Andasibe is located close to many protected rainforests. Camera trap surveys in the VOI and Mitsinjo showed that dogs did wander into the rainforest to forage for food.



Figure 3. Mobile clinic was open every day and offered free wellness checks, treatment, spays/neuters, and vaccinations.

- I assisted veterinarians in completing patient intake forms, collecting various samples, and working in the laboratory—conducting WITNESS heartworm and modified Knott's tests, and preparing blood smears.
- Collected blood cards for my thesis.
- In my spare time, I shadowed teammates to develop connections between our projects.



Figure 5. While conducting village nutrition interviews, we discovered homes that had been damaged by Cyclone Enawo, which changed human and animal eating behaviors.

- The environment indirectly impacted human and dog health through crop destruction caused by Cyclone Enawo in March 2017.
- Habitats and typical ranges were disrupted, and studies showed that mouse lemurs have been found to be carrying heartworms.
- Increased tourism might exacerbate this.

Discussion

- Malagasy dog owners were more likely to consent to spays/neuters if rabies vaccinations were used as a bargaining chip.
- Families would often feed dogs after feeding children—many dogs would be forced to forage for food in the rainforest.
- Although it is still unknown what dogs eat when they wander into the rainforest, we assume that they outcompete lemurs.
- Implications for zoonotic disease spread.
- The laboratory component, which involves studying the roles of host genetics, demographics, and spatial interactions on nasal microbiome composition in Malagasy dogs, will be completed this year.

Conclusion

- OneHealth shows that Malagasy dogs have complex interactions with their environments and human owners.
- These observations could help explain factors that lead to differences in nasal microbiome compositions.

Acknowledgements

I extend my sincerest thanks to Professor Metcalf, Professor vonHoldt, and Malavika Rajeev for making this research project possible. Another round of thanks to The Mad Dog Initiative team for hosting me this summer. I also thank the Center for Health and Wellbeing, Department of Ecology and Evolutionary Biology, Office of the Dean of the College, and Princeton Environmental Institute for financial support.