PROCEEDINGS

International Seminar

Studies on Bali Dog:
Genetics, Culture, Diseases,
Zoonoses and Community Health

Postgraduate Master Program of Public Health Faculty of
Medicine & Udayana One Health Collaboration Center
Udayana University

Denpasar, 31st March – 1st April 2017

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BACKGROUND

The indigenous Bali Dog (*Anjing Bali*) has coexisted with the Balinese for thousands of years, probably arriving on the island with some of the earliest waves of migrants from mainland Asia. The Bali Dog has long played an important cultural and ecological role, guarding household compounds and temples from human and spiritual intruders; helping keep pests including rats, snakes and marauding monkeys away from crops and households; and helping to manage waste on the island by eating the refuse thrown away by Bali’s inhabitants. Dogs feature prominently in several Hindu stories, and are held up as an example for humans of faithfulness and steadfastness. Culturally, there is an elaborate traditional categorization of Bali Dogs based on temperament, color, measurements, and tail shape. Smart, loyal, hardy and sociable, they have been an integral element of Balinese communities for thousands of years.

Genetic research has determined that the Bali Dog is one of the world’s oldest dogs, sharing DNA with several other Austral-asian dog breeds, including the Australian Dingo, Japanese Akita and Chow-chow. Until the recent introduction of pure-bred and mixed breed dog imported from Java and elsewhere, the Bali Dog, both the highland Kintamani and the lowland short-haired, had unadulterated genetic lineages estimated to be between 10 and 15 thousand years old. This rich genetic heritage is a priceless resource for biologists, animal geneticists and animal behavior experts who continue to do research to understand how dogs evolved, and how humans and dogs developed their unique relationship.
The Bali Dog is underappreciated both in terms of its singular genetic identity, and because it is considered of no value and low status compared to pure- and mixed-breed dogs that command high market prices. Its long-term existence is also currently under threat because of several factors, including the dog meat trade, the endemic rabies epidemic, and the preference for breed dogs among Balinese.
PREFACE

Postgraduate Master Program of Public Health Faculty of Medicine and One Health Collaboration Centre Udayana University, Supported by International Fund for Animal Welfare united States and Bali Animal Welfare Association held an International Seminar about Studies on Bali Dog in 31th March – 1st April 2017 to disseminate results of national and international research on the Bali Dog, to publish its uniqueness as well as to discuss what can be done to address the threats to the continued existence of this neglected element of Bali’s heritage.
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## TABLE OF CONTENT

Unlocking secrets of dog origins and spread: a genetic perspective on the dogs of Bali (and Southeast Asia):
Ancient Asian dogs and the genetics of the bali dog: why is the bali dog unique?
Benjamin Sack ................................................................. 1-7

Participatory learning and action: a pilot program using behavior change principles to improve dog ownership in Bali
Kate Nattrass Atema .......................................................... 8-9

Threats to the bali dog
Janice Girardi, Ni Wayan Arya Utami,
Kadek Karang Agustina ..................................................... 10-17

Program dharma: community empowerment management of bali dog for public health
Ida Bagus Ngurah Swacita, Ni Wayan Arya Utami, I Made Subrata, Sang Gede Purnama, Kadek Karang Agustina,
Putu Pande Januraga, Dewa Nyoman Wirawan .....................18-21

Bali dog community: sekehe asu bali
Gusti Ngurah Surya Anaya .................................................. 22-26

Implementation animal welfare in dogs in Sanur Villages, Denpasar-Bali
Kadek Karang Agustina ...................................................... 27-32

Dog status in Kelurahan Sanur Denpasar-Bali
I Made Subrata .................................................................... 33-38

Seroprevalence of canine parvovirus infection in kintamani dogs at Sukawana village
I Gusti Ayu Agung Suartini, I Nyoman Suarsana,
Ni LuhEka Setiasih, Indrawati Sendow .............................. 39
A pathological case study on bali local dog infected with canine distemper virus
I Made Kardena, Gede Putra Sanjaya .............................................. 40-49

Survey of dogs in Mendoyo Jembrana
Kadek Karang Agustina ................................................................. 50-55

Dog ecology and demography in Sanur Bali
Ida Bagus Ngurah Swacita ......................................................... 56-61

Distribution and manifestation of vacuolization in the brain of rabies-infected dogs in Bali
I Ketut Berata ............................................................................. 62-67

Case of canine distemper in Denpasar (Period 2014-2016)
Gusti Ayu Yuniati Kencana, Ida Bagus Oka Winaya .............. 68-74

Pathological observation on bali local dogs infected by parvovirus
I Made Kardena, Anak Aagung Ayu Mirah Adi, I Ketut Berata, Ida Bagus Oka Winaya, Ida Bagus Windia Adnyana ................................................................. 75-81

Description of radiology and histopathology of dog femur post implantation of porcine cortical bone xenograft (PCBX)
I Wayan Wirata, Anak Aagung Gde Oka Dharmayudha, I Wayan Nico Fajar Gunawan, Luh Made Sudimartini.......... 82-89

Larva migrans: a potential zoonotic parasite infection of dog in Bali
Nyoman Adi Suratma, Hapsari Mahatmi .............................. 90-96

Parasitic protozoan disease in dogs: be aware of zoonotic
Ida Ayu pasti Apsari ............................................................... 97-105
Ivermectin as anti ectoparasite and endoparasite of dog
Siswanto .................................................................106-112

Babesiosis a tick-borne zoonotic disease
I Putu Gede Yudhi Arjentinia, Putu Ayu Sisyawati
Putriningsih ..............................................................113-118

Dermatophytosis (ringworm) in dogs: the zoonotic potential
Putu Ayu Sisyawati Putriningsih, I Putu Gede Yudhi Arjentinia ........................................119-124

Empowering society as once strategy to combat rabies in Bali
I Nyoman Suartha, I Gusti Made Krisna Erawan, Srikayati Widtastuti, Made Suma Anthara, I Wayan Wirata,
I Gusti Ngurah Kade Mahardika ........................................125-130

Clusterization of dog maintenance system that has risk of rabies in villages reported negative rabies in Jembrana regency
Tjokorda Sari Nindhia, I Wayan Batan, I Putu Sampurna,
Ekklesia Prastya .......................................................... 131-138

Surveying roaming dogs density in Sanur area
Ni Wayan Arya Utami .................................................. 139-149

Comparison of attitude survey in two areas of Sanur Kaja and Sanur Village in community-based efforts to control rabies
Sang Gede Purnama .................................................... 150-155

Post rabies vaccination response of Bali dog
Ida Bagus Kade Suardana ............................................. 156-161
Prevalence of zoonotic intestinal helminths and ectoparasite in dogs in Bali

Ashitaba (Angelica keiskei) herbs improve an antibody titer of rabies in young kintamani dogs
I Wayan Sudira, I Made Merdana ........................................... 170

Histological structure of the vagina, uterus, and ovary of the kintamani dogs on the sexual maturity
Ni Luh Eka Setiasih, Putu Suastika ........................................ 171

Balinese Hindu cultural studies approach in upkeep dogs as one of the effort of freeing Bali from rabies threat
Ketut Tono PG, Putu Suastika................................................ 172

Leptospirosis in dogs: Important zoonosis
I Ketut Suada, Mas Djoko Rudyanto ..................................... 173

Haematological profile and blood biochemical of kintamani dog in Sukawana Village
I Gusti Ayu Agung Suartini, Ni Nyoman Werdi Susari ... 174

Mapping and analysis of rabies cases in Buleleng regency period 2010-2016
I Wayan Suardana, Syinthia Arya Novianti, I Wayan Batan............................................................................. 175

Prevalence and identification of dogs scabies in Denpasar
Ida Bagus Made Oka, I Made Dwinata.................................. 176

What is bali dogs
Gusti Ngurah Bagus ............................................................. 177
BABESIOSIS: A POTENTIALLY TICK-BORNE ZOONOTIC DISEASE

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ABSTRACT

Babesiosis is a tick-borne disease, caused agent by *Babesia spp.*, affecting humans and many domestic dogs, including Kintamani dogs. Domestic dogs showing appreciable in mortality and morbidity. Babesiosis symptom can characterized by ictherus, fever, haemolytic anemia, haemoglobinuria, and death of dog. Cacine babesiosis can range from chronic to subclinical and acute, depending on the virulence of *Babesia spp.* and the host susceptibility. The aim of this study was determine the status of *Babesia spp.* infection in domestic dogs, including Kintamani dogs and zoonotic potential through of ticks transmission. For this research, 45 domestic dogs including kintamani dogs were examined by the blood smears and rapid test examination. The presence of ticks infestation were investigated. Eight (0.17%) samples were detected positive by blood smears an 16 (0.35%) samples were detected positive by rapid test. From 34 positive samples, 12 (0.35%) dogs were found of *Rhipicepalus spp.* and *Amblyomma spp.* All of dogs are potentially infected with *Babesia spp.* by ticks transmission, and as well as potentially as zoonotic disease of *Babesia spp.* infection especially from kintamani dogs to humans.

Keywords: Babesiosis, dogs, ticks, zoonosis
INTRODUCTION

Babesiosis is a tick-borne disease of animals, caused agent by a haemoproteozoan obligate parasite of genus Babesia (Jegede et al. 2014). Babesiosis which primarily affects in erythrocytes causing intra-erythrocytic parasitemia, resulting in both intravascular and extravascular haemolysis. Babesiosis can cause of ichterus, fever, haemolytic anemia, haemoglobinuria and death of dogs (Schoeman 2009). The disease is often found in tropical, subtropical, and temperate climates. Babesia canis and Babesia gibsoni are most commonly found in dogs (Cleveland et al. 2002).

The Babesia spp., readily parasitize to the red blood cells are morphologically classified into large and small forms. Canine babesiosis ranges in severity from relatively mild to fatal and haemolytic anemia is the main clinical sign. Infection in dog may occur by tick transmission via blood transfer of dogs bites, blood transfusion, and transplacental transmission. Tick bites are most common mode of transmission. Babesia sp. used the tick as a vector to reach host of dogs, and than multiply immediately with the erythrocytes of the host (Uilenberg 2006).

Many species of Babesia belonging to the two forms of Babesia, larger form is Babesia canis and smaller form is Babesia gibsoni, are pathogenic of the dogs. The major Babesia canis is found exclusively in the dog with the tick Rhipicephalus sanguineus as its major vector (Jegede et al. 2014). Cacine babesiosis can range from chronic to subclinical and acute, depending on the virulence of Babesia spp. and the host susceptibility. The aim of this study was determine the status of Babesia spp. infection in domestic dogs, including Kintamani dogs and zoonotic potential through of ticks transmission

CLINICAL SIGN

In dogs, Babesia readily to erythrocytes and can cause an increase in body temperature and breath frequency. The visible symptom are
haemoglobinuria, icterus, and splenomegaly. Chronic symptoms that appear are fever, loss of appetite and loss of weight, that the dog becomes weak and anorexia (Skotarczak 2008). The acute symptoms are icterus and anemia. Anemia occurs when the red blood cells are infested by the parasite causing abnormalities in red blood cells in the form of irregular surfaces. The irregular form of red blood cells affects the hemoglobin content that binds oxygen. The red blood cells that have the abnormality will be excreted from the circulation by the spleen. The presence of parasitic infestations may also cause the occurrence of hemolysis (intravascular) which causes anemia (Taylor et al. 2007).

**MATERIALS AND METHODS**

For this research, 2ml blood samples were collected aseptically using disposable syringes from the cephalic vein of each dog into tube with anticoagulants. The samples were collected from 45 domestic dogs including kintamani. The blood samples were examined by the blood smears and rapid test examination with Canine Babesiosis Detection Kit from PockitTM/PetNADTM.

For the blood smears, a drop of blood was placed near one end of a clean glass object and a spreader was used to prepare the thin smear. The smear was allowed to air-dry. The dried blood smear was fixed in absolute alcohol for two minutes and allowed to dry. The smear were placed on staining trough and stained with Giemsa stain for 30 minutes. After that, the smears were washed with phosphate buffered saline (PBS) or slow water flow to remove excess stains. The slides were then air-dried and examined under oil-immersion (objective x100) lens for *Babesia spp*.

**RESULT**

The infection of *Babesia spp.* in total of 45 domestic dogs were sampled 8 (0.17%) samples were detected positive by blood smears and 16 (0.35%) samples were detected positive by Canine Babesiosis detection kit. The 45
domestic dogs were sampled, 12 (0.35%) dogs were found of *Rhipicepalus spp.* and *Amblyomma spp.* infestation. The result were presents in table.

Table 1. Prevalence of *Babesia spp.* in relation to tick infestation

<table>
<thead>
<tr>
<th>Parameters</th>
<th>No. of Dogs</th>
<th>Positive No. (%) infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood smear</td>
<td>24</td>
<td>8 (0.17)</td>
</tr>
<tr>
<td>Canine Babesiosis detection kit</td>
<td>24</td>
<td>16 (0.35)</td>
</tr>
<tr>
<td>Tick Infestation</td>
<td>45</td>
<td>12 (0.35)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Babesia is among widely distributed red blood cells parasites of dogs occurring in almost anywhere tick vector *Rhipicepalus spp.* and *Amblyomma spp.* are reported. There are three levels of parasitemia, 1) Mild levels, if one to four parasites per 500 erythrocytes are found (paracitosis 1%); 2) The second level is the severe reaction when five to ten parasites per 500 erythrocytes are present (3% parasitosis); and 3) The third level is very severe reaction (i.e., severe reaction) that if found more than ten parasites every 500 erythrocytes (parasitosis 5-9%) (Birkenheuer et al. 2003).

The present study shows that the level of parasitemia from *Babesia spp.* in domestic dogs is still in a mild reaction, less than 1% so that it will caused parasitiasis. Parasitiasis is a condition which a parasitic infection has not resulted in clearly lesion or clearly clinical sign. If parasitic infections coincide with other blood parasites, mild parasitemia levels can lead to clinical symptoms (Birkenheuer et al. 2003; Simoes et al. 2011).

Stress in animals will occurred the infection of blood parasites, because the decreased conditions will cause the immune-system and caused increased of parasitic infections. Transmission of blood parasites from one animal to
another can be mediated by the tick vector. Infestations of ticks can lead to the onset of clinical symptoms of anemia because the ticks will suck blood (James and Leah 2001). In Europe, it is highly probable that *Babesia microti* strains may also infect in the tick *Ixodes ricinus* may potentially cause zoonosis to human.

**CONCLUSION**

In conclusion, all of dogs are potentially infected with *Babesia spp.* transmitted by ticks vector transmition. Babesiosis are potentially as zoonotic disease of *Babesia spp.* infection from domestic dogs to humans. Prevention and control can only be achieved throught administration of prophylaxis, bathing with acaricides, monitoring and grooming of dogs, fumigation of kennels and houses and above all, provision of laws to enforce a high standard of public and veterinary health.

**REFERENCES**


Taylor, MA., Coop, RL., and Wall, RL. 2007. Veterinary Parasitology. 3\textsuperscript{th} Edition Hongkong: Graphicraft Limited