

Plasmodiosis on *Rhyticeros cassidix*

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Abstract

The research objective was to determine the symptoms of plasmodiosis in Sulawesi hornbill (*Rhyticeros cassidix*), the form of *Plasmodium sp.* in the blood and how to treat that can be done by a veterinarian. Plasmodiosis is a disease caused by blood parasite infection. The Sulawesi hornbill (*Rhyticeros cassidix*) observed came from a zoo in Makassar. Clinical symptoms that appear in infected birds are weakness, lethargy, dyspnoe, anemia, abdominal distension, ocular hemorrhage, and death. Plasmodium infection in red blood cells causes blood pH to drop so that the binding of oxygen by hemoglobin drops. This causes the birds to experience a lack of oxygen supply (*anoxia*). A blood sample is needed to diagnose plasmodiosis through microscopic examination. Poultry blood was taken from the *Brachial vein* on the wing. The blood is then put into a tube containing EDTA or apendorf and sent to the laboratory in a cooler box. Treatment is carried out by injecting 0.25 ml of *medoxyLA* (*oxytetracycline*), giving orally 2 ml of *metronidazole* and providing a supportive, namely vitamin *Bcomplex* 0.5 ml. All treatments are given once a day for 5 days.

Keywords :Sulawesi hornbill (*Rhyticeros cassidix*), Plasmodiosis, *Plasmodium sp.*

1. INTRODUCTION

Plasmodiosis is a disease caused by infection with protozoa of the *Plasmodium sp.* The disease can attack various types of animals, both mammals and poultry. Plasmodiosis is an arthropod born disease or disease transmitted by arthropods. In this case, the mosquitoes that act as biological vectors for the spread of Plasmoscopic disease in humans, mammals and birds are *Culex sp.*, *Culiseta sp.*, And *Aedes sp*[4].

Sub kelas	<i>Telosporidia</i>
Ordo	<i>Coccidiomorphida</i>
Sub ordo	<i>Haemosporidinae</i>
Genus	<i>Plasmodium</i>

Table 1. Taxonomy of *Plasmodium sp.*

The Plasmodium life cycle involves mosquitoes as its biological vector. Plasmodium reproduces through the asexual and sexual stages. The asexual stage occurs in the host's body, while the sexual stage occurs in the mosquito's body [3]. The infected mosquito has sporozoites in its salivary glands. When the mosquito sucks the host's blood, the sporozoites from the mosquito's salivary glands are transferred to the host's body. The sporozoites will infiltrate the macrophage cells around the skin and

form pre-erythrocytic schizonts or so-called cryptozoites [5]. These cryptozoites undergo development to form merozoites which will come out when macrophages are lysed. The released merozoites will re-infiltrate the macrophages on the skin or what is called metacryptozoites. Just like cryptozoites, metacryptozoites will also undergo development to form merozoites that will come out when macrophages are lysed [11], [6], [8]. Merozoites that come out of the metacryptozoites will go out into red blood cells (*erythrocytic schizonts*) and other body cells (*exo-erythrocytic schizonts*) [2].

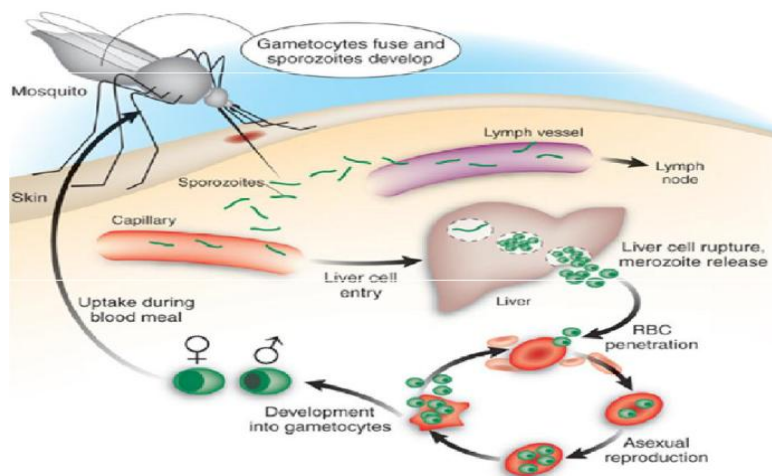


Figure 1. Life cycle of *Plasmodium* sp.

Plasmodiosis is a disease caused by infection with the blood parasites of *Culex sp. Mosquitoes*, *Aedes sp.*, And sometimes *Anopheles sp.* is a vector that acts as a disease transmitter[13], [1]. Mosquitoes that suck the blood of infected birds can transmit the disease to other birds in the same farm. Plasmodiosis is only horizontally transmitted and is not passed from parent to child [7].

2. METHOD

Diagnosis of the possibility of plasmodiosis is done by looking at the clinical symptoms that appear, blood smear examination, or serological examination (ELISA test) or molecular using PCR. A blood sample is needed to diagnose plasmodiosis through microscopic examination. Poultry blood was taken from the *Brachial vein* on the wing. The blood is then put into a tube containing EDTA or apendorf and sent to the laboratory in a cooler box. Observations under a microscope were observed with 40x and 100x magnification.

3. RESULTS AND DISCUSSION

The research was conducted at one of the zoo in Makassar City, South Sulawesi. Clinical symptoms that appear in infected Sulawesi hornbills include weakness, lethargy, dyspnoe, anemia, abdominal distension, ocular hemorrhage, and death. *Plasmodium* infection in red blood cells causes blood pH to drop so that the binding of oxygen by hemoglobin drops.

Poultry blood was taken from the *Brachial vein* on the wing and then carried out a blood smear (*Giemsa staining*), observed under microscopy at 40x and 100x magnification, and the discovery of

Plasmodium sp. This confirms the diagnosis that the Sulawesi hornbill (*Rhyticeros cassidix*) is positive for Plasmodiosis [9], [15].

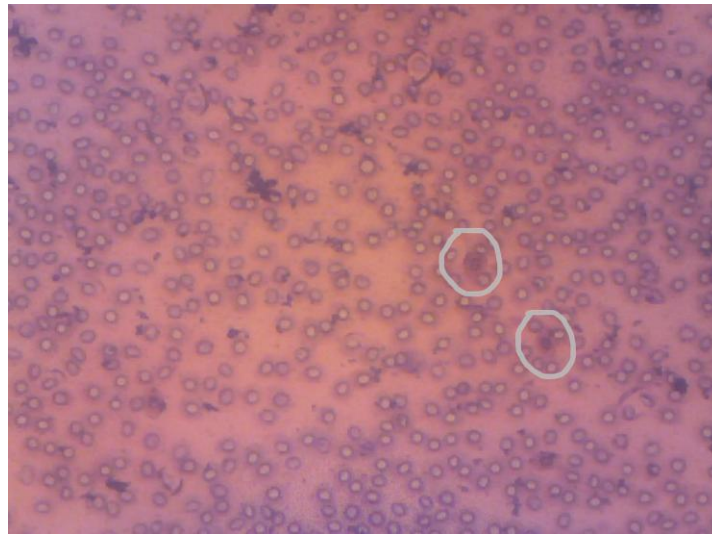


Figure 2. *Plasmodium sp.* on the blood sample (roundabout) observation in 100x magnification microscope

The smear preparation method is commonly used when observing body tissues or cells such as blood cells under a microscope. The preparation of the blood smear is done by dripping blood on one end of the clean glass object, then with another glass object placed close to the drop of blood at an angle of 45° [17]. The object of the wiper glass is shifted towards the drop of blood so that the blood is spread across the surface of the wiper glass, quickly the glass the eraser is shifted in the opposite direction, so that the blood will be evenly distributed over the glass object as a thin layer.

The blood smear is dried by aerating, if it is dry it is labeled with information on the chicken number, date, time of collection and other notes deemed necessary. Then fixed with methanol for 10 minutes, then washed using running water, colored using giemsa and let stand for \pm 10 minutes then rinsed using running water and dried by aerating. After smearing the preparation, the blood smear is stained to give the sample a color effect [14]. Staining using giemsa solution. After drying, it is stored in a preparation box for laboratory examination.

The merozoite form of *Plasmodium sp.* Is generally round like a ring which is clearly visible in erythrocytes. The shape of this merozoite can be round like a single or multiple rings. Erozoites are usually round in shape around the nucleus of blood cells and in large numbers can destroy erythrocytes [10]. Gametocytes are elongated or round in shape and have a single nucleus. Male gametocytes (microgametocytes) are generally colored as a pink stain with the giemsa stain, while macrogametocytes are generally colored like a pale blue stain [16].

Treatment is carried out by injecting 0.25 ml of medoxyLA (*oxytetracycline*), giving orally 2 ml of metronidazole and providing a supportive, namely vitamin Bcomplex 0.5 ml. All treatments are given once a day for 5 days.

Oxytetracycline is a tetracycline antibiotic drug. Tetracyclines generally act as a bacteriostatic antibiotic, inhibiting protein synthesis by binding reversibly to the 30S subunit of the ribosomal susceptible organisms, preventing binding to the ribosome transfer aminoacyl-RNA. Tetracyclines are also believed to reversibly bind to the 50S ribosome and also alter cytoplasmic membrane permeability in susceptible organisms. After *intramuscular* administration oxytetracycline LA has significantly slower absorption rate after *intramuscular* injection.

Metronidazole is known as an antibacterial, antiprotozoa and radiation-sensitizer. Antibacterial in preventing the spread of infectious agents or killing the infectious agent from spreading. Its mechanism of action is to inhibit nucleic acid synthesis by damaging DNA. As an antiprotozoa, metronidazole works by digesting the protozoa. Meanwhile, as a radiation-sensitizer, metronidazole can effectively damage unwanted cells.

Lack of one of the eight types of B vitamins will interfere with the metabolic process. Therefore, to achieve the best results all types of B vitamins should be consumed in moderation. This is what makes vitamin B Complex supplements necessary.

4. CONCLUSION

Case of plasmodiosis in Sulawesi hornbill (*Rhyticeros cassidix*), to diagnose it, blood was taken from the *Brachial vein* on the wing then blood smear test (*Giemsastaining*), after getting a positive result was given treatment for 5 days using *Metronidazole*, *Oxytetracycline* and vitamin *BComplex*. *Biosecurity* needs to be improved to prevent disease transmission between animals and zoonoses. Availability of supporting equipment for diagnosis and treatment of animals needs to be increased in a zoo for the survival of animals.

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