

BLOOD PROTOZOA AMONG DIFERENCE SPECIES OF BIRDS IN CIKANANGA SUKABUMI

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ABSTRACT

Based on World Conservation Monitoring Committee (1994), Indonesia has natural resources such as 10 % plants, 12 % mammalian, 16 % amphibian and reptiles, 15 % insects, 17 5 birds, and more than 25 % species of fishes from around the world. Indonesia has about 1.539 species of birds from 9.052 species in the world. As much as 381 (4%) species of Indonesia birds are found only in Indonesia such as Jalak Bali, Maleo, Cendrawasih and Elang Jawa. These population of birds will become less and less if people don't protect them by caring them in such way. Decreasing deforestation as their habitat, stop hunting them for personal collecting or trading, and preventing them from diseases would conserve them. Blood protozoa such as *Plasmodium* spp is one of agent of disease, that could effect their health status for example impairment of their performance reproduction. In order to examine blood protozoa, blood smears were made from 16 birds in Cikananga Sukabumi Conservation Area. The result show that almost all birds carried *Plasmodium* spp. in their blood. Health status examination of birds would give some benefits to birds for their continuing live and to people for preventing them from transmitted diseases.

Key words : Blood Protozoa, Birds, Cikananga

BACK GROUND AND LITERATURE STUDY

Health connects all species on the planet. It is unifying principle of sustaining life at all levels. The health of the biosphere, ecosystems, species, and people form an inextricable continuum of interdependence. The disturbance of one of its will give bad influence to another. There are almost no examples of emerging wildlife disease not driven by human environmental change (Norris, 2001). The damage of ecological would provide new habitat for developing new disease and threat health or life at all levels (Alikodra, 2001). Habitat deforestation, hunting, collecting or trading one or more species and diseases would not conserve them. In order to conserve some species of Indonesia, Cikananga Sukabumi is one of conservation recovery area. They help and send some healthy species back to their nature environment. Based on World Conservation Monitoring Committee (1994), Indonesia has natural resources such as 10 % plant, 12 % mammalian, 16 % amphibian and reptiles, 15 % insect, 17 5 birds, and more than 25 % species of fishes from around the world. Indonesia has about 1.539 species of birds from 9.052 species in the world. As much as 381 (4%) species of Indonesia birds are found only in Indonesia such as Jalak Bali, Maleo, Cendrawasih and Elang Jawa.

Blood examination is one indicator of health status because it will represent the physiological or clinical/pathological state. Sixteen birds in Cikananga Sukabumi Conservation Recovery

Area were examined for protozoa through their blood examination. Protozoa is one of agent of diseases that could effect their health status for example impairment of their performance reproduction.

Protozoa is endoparasite or internal parasite that live within an animal/host. There are many different groups of protozoa living in many different host tissues. Most of them will be found either in blood samples (hemoprotozoa) or fecal sample (intestinal protozoa). Their life cycle vary from simple to very complex. In the complex life cycles, there are a few stage names that are important to understand. Most hemoprotozoa are diagnosed in Red Blood Cell in blood smear. *Plasmodium* spp is hemoprotozoa parasite. It was reported that *Plasmodium gallinaceum* in chickens have caused high mortality (Paulman and Mc. Allister, 2005). Several early investigators have examined that *Plasmodium gallinaceum* can be transmitted by mosquito. Transmission of malaria parasites occurs by relatively few species of mosquitoes (Shahabuddin et al. 1996).

METHODE

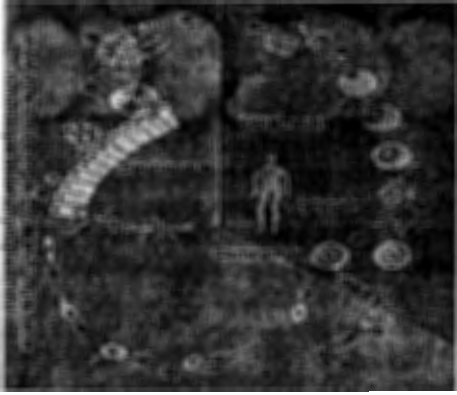
Blood smear were collected from 16 birds in Cikananga Sukabumi Conservation Recovery Area and taken from axilaris vein. Blood smear were fixed in methanol for 5 minutes and colored by giemsa procedure for 30 minutes.

RESULT AND DISCUSSION

Table 1. Blood smear diagnosis on birds in Cikananga Sukabumi Conservation Recovery Area.

No	Code	Location	Result
1	E.B./1	I	<i>Plasmodium</i> spp.
2	E.U./2/1,00	I	<i>Plasmodium</i> spp.
3	E.B./3/1,7	I	<i>Plasmodium</i> spp.
4	E.B./4/2	I	<i>Plasmodium</i> spp.
5	E.J./5/B3.06	I	<i>Plasmodium</i> spp.
6	E.U./6/Un	I	<i>Plasmodium</i> spp.
7	E.B./7/7.0	I	<i>Plasmodium</i> spp.
8	B.K./8/B1.04	II	<i>Plasmodium</i> spp.
9	B.K./9/0.9/B1.13	II	<i>Plasmodium</i> spp.
10	K.M./10/1.5/A3.16	II	-
11	K.M./11	II	-
12	B.H./12	II	<i>Plasmodium</i> spp.
13	B.M./13/A15.6	II	-
14	K.S./14	III	<i>Plasmodium</i> spp.
15	K.S./14	III	-
16	K.K./16/B1.01	III	<i>Plasmodium</i> spp.

Plasmodium spp. is hemoprotozoa parasite that naturally infected jungle fowl and chickens and caused malaria disease and are therefore of economic importance. It can be transmitted



by mosquito so it will spread very fast that birds will have high mortality. Therefore early detection of blood parasites would give some benefits especially by saving the birds from the dead and finally we will conserve them. It will cause disadvantage for chicken farmers because that mortality would impact to economic importance. Clinical sign of malaria illness are parasitemia, anemia, and increase polychromatophil. The earliest clinical sign was bright green coloration of feces for 2 days due to increased hemoglobin catabolism and resulting increased biliverdin excretion, at the same time the Pack Cell Volume (PCV) began to drop. It was reported by

Paulman and Mc Allister (2005) that parasitized erythrocytes were observed 7 days after exposure to infected mosquitoes. Sporozoites of *Plasmodium gallinaceum* enter macrophage cells in the skin near the site of their injection by the bite of an infected mosquito. They develop into schizont (*cryptozoites*) and after cell division the *nerozoites* again enter macrophage cells and undergo and second schizogonic cycle (*matacryptozoites*). Some of the second generation of merozoites again enter tissue cells, others invade erythrocytes. Thereafter asexual reproduction continues both in blood and tissue cells. In this phase of the infection the exoerythrocytic schizonts (*phanerozoites*) develop mainly in endothelial cells of sinusoids and capillaries. Gametocytes develop in mature erythrocyte and appear early in the infection together with the first asexual erythrocytic forms. The parasites are seen in the cytoplasm of red blood cells. *Plasmodium gallinaceum* is a large species, the fully grown schizonts and the gametocytes occupy about two-thirds of the cytoplasm of the host cell and may displace the nucleus. The natural host in the jungle fowl but from time to time the parasite is introduced into domestic flocks. The infection appears to be mild in indigenous breeds of hens (Adam et al. 1971).

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DUGONG IN SEAWORLD INDONESIA

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A. INTRODUCTION TO DUGONG**1. Nomenclature**

The term 'Sirenia' the order to which the Dugong and Manatees belong. Its remind us of sea nymphs in Greek mythology. The Malayan-Javanese word 'duyung' (Revees et al. 1992) it probably means 'sea pig'.

Katoka (1994) reports that 'duyung' means 'beautiful girl'. In Philippines it has been translated to 'sleepy' in the Cuyorin dialect.

The name for Dugong differs in many countries, the most common name is 'duyung', sea cow and mermaids. Other interesting names for Dugongs around the world are listed in table 1.

Area	Local names	Means
Red sea Indonesia	<i>Gueld</i> <i>Sakoko ka kaot</i> <i>Sabi duyung</i> <i>Ikan duyung</i>	Skin/ leather Pig into the sea Sea pig Fish
Sri Lanka	<i>Ruyong</i> <i>Mudu uru</i> <i>Kadal pandi</i> <i>Orgil</i>	Pis in the sea Sea pig Sea pig
India	<i>Avuliya</i> <i>Avolia</i> <i>Kadal panni</i>	Feeds with mammary glands
Malaysia	<i>Duyong</i>	Sea pig
Thailand	<i>Payoon</i> <i>Ngjork</i>	Mermaids
Madagaskar	<i>Damboaran</i>	Wild pig of the coral
Papua	<i>Kamendra</i>	
Guinea	<i>Rui</i> <i>Pismeri</i> <i>Bonon</i>	

2. Evolution

Sirenians have evolved from four legged hooved mammals of the early Eocene Epoch, a geological time which was about 53 million years ago or possibly even earlier.

These herbivorous stem animal or subungulates are also the ancestors of elephants and hyraces, making them the closest relatives of Dugongs and Manatees.

On the other hand, cetacean (whales, dolphins and porpoises) and pinnipeds (seals, sea lions and walrus) have evolved from stem carnivore around 60-30 millions years ago, respectively.

Through millions of years, these land-dwelling ungulates have evolved to alive adapted to the sea. Their hind limbs degenerated, they developed a flattened tail, their front leg became paddle-like, their external ears disappear and their hairy coat became sparse all in favor of aquatic environment.

3. Taxonomy

There are only four living species of the mammalian order sirenian. Although five subfamilies are known under the dugongidae family the Steller's sea cow became extinct in recent times, leaving the Dugong as the only survivor today.

The three other living species under the family trichechidae are Manatees. The West Indian Manatees includes two subspecies, namely The Antillean and Florida Manatees. The other two species are the West African and Amazonian Manatees.

4. Description

An adult Dugong can grow more than 3 meters in length, average size ranging from 2, 4-2, 7 meters, they can reach 400 kg weight.

Marsh (1999) reported that Dugongs can live until 73 years old, they puberty at 10-17 years old. Gestation periods are in region of 13-15 month, the calf suckles for 14-18 month and stay with the mother for up to 2 years. Marsh et al. (1985) report that mature dugong measures at least 2,5 meters in length.

The Dugongs body is torpedo-shaped with small and short flippers and whale-like tail flukes. The flipper used for maneuvering and support during feeding and while resting at sea bottom.

The color of an adult Dugong is grayish bronze which becomes lighter ventrally. Neonatal and juveniles have deeper brown color, the skin is tough, usually heavily scarred and colonized with barnacles in older animals. Its short stiff and fine thin hairs are sparsely distributed throughout the back of the animal. Hair is scarce in the abdomen but is longer, thicker and more abundant in snout region. The tactile or sinus hair of dugong said to be very well-developed and sensitive to stimuli.

The eyes of Dugong are round, small and dark. They're closed by lids with a sphincter action. The eyes of Dugong produce tears from a gland under the eyelids. A secretion is evident when the eyes are exposed out of the water. The ears lack pinnae and appear as small holes on the side of the head.

Sexing differentiate can be easily look from each other by the location of their genital apertures. The penis of the male is found inside a genital slit centrally located between the anus and umbilicus. The shaft is extruded only when the male is excited. The female genital slit, on the other hands is located proximal to the anus.

5. Behavior

Dugong constantly breathing every one or two minutes. The longest recorded breathing interval for Dugong in captivity is around 8 minutes. Dugong swim at a very slow pace, about 5 km/hour (Preen, 1991), the flippers are pressed against the body during swimming and propulsion is accomplished with the vertical movement of the tail. Movement is sluggish when undisturbed and they can usually be seen apparently inactive at the surface of the water or resting on the sea bottom. Dugongs are apparently more active during day time.

6. Feeding

Dugongs are benthic grazers of a wide range of sea grasses. Littoral and sublittoral sea grasses are the only true flowering plants of the sea. They also feed on different species of algae and several macroinvertebrates, though it is not certain if these are required by them or are just incidentally eaten.

They prefer small, soft grasses that are easy to digest, low in fiber and high in nutrient. They also look eating when the water is high.

B. STATUS OF DUGONG

1. Habitat and Distribution

Dugongs occur in shallow coastal waters with depth of about 2 to 10 meters, though it is not unusual to find them in waters up to 37 meters deep, they have been found to wander as far as 80 km or more of shore and are known to cross open seas. Some are even found to enter tidal creeks and river mouths (Marsh 1991b).

All Sirenians are distributed within the tropical and subtropical waters of the world confined within a longitudinal range between 170°E in the New Hebrides and 30°E at the head of the gulf of Suez (Bertram 1979) and a longitudinal range between 26°N to 27°S of the equator (Marsh 1993).

The dugong's population extends from the east coast to Africa to the Red Sea and the Persian Gulf in the Indian Ocean, to Vanuatu and New Caledonia in the Pasific.

2. Status in the World

From records, there are indications which suggest the depletion of their population worldwide. The historic range of the dugong included most coastal areas of the Indo-West Pasific

(Reeves et al. 1992). Today, only relic populations remain and these are separated by large areas where in dugong populations are either close to extinction or are already extinct.

The decreasing number of dugongs is caused by various threats. Direct threats include hunting and incidental catches which are prevalent throughout their range. Long term threats include pollutions, destruction of sea grass beds, and encroachment in coastal areas by the increasing human population and development.

The dugong is exploited for its meat, oil and by products which are of considerable economic value. In areas where they are abundant, they play a part in the traditional culture and religion of coastal communities.

Natural mortalities are caused by diseases and old age. Dugongs are preyed upon by large sharks, killer whales and saltwater crocodiles. Cyclones also pose a threat to dugongs by causing them to be stranded or by destroying their food stock. So far, man is still main predator of the dugong.

Dugongs have very low reproductive rates, a fact which makes it very hard for a depleted population to recover. Every female in a given population gives a birth every three years starting at age ten, an increase only 5% per years expected. From this information at least need 98% surviving adult to maintain a given populations.

The dugong is classified by the IUCN-World Conservation Union as vulnerable to extinction since 1982. The dugong is also listed in Appendix I of the Convention on International Trade in Endangered species (CITES) of wild Flora and Fauna.

C. KEEPING DUGONG IN SEAWORLD INDONESIA

1. History

The first attempt to keeping dugongs is an aquarium of Seaworld Indonesia was at 2001. A male dugong called "cecep" was transported from Cipanon Labuhan, Serang to Seaworld Indonesia at November 28th 2001.

Diana is the youngest dugong in Seaworld Indonesia. She was captive at Cipanon in Desember 10th 2005. She was 135 cm length and 38 kg weight.

2. Daily Activities

Every day at 06.30 keepers are cleaning the sea grass and weighing it. Then they are vacuuming the pool and clean the acrylic.

Diana feeds 4 times a day, each times she feeds with milk \pm 300 ml and sea grass at least 1 kg. Within the time feeding she also given vitamins, common vitamin we use are Thiamin, Cotazym Forte[®] (multi enzymes preparation), multi vitamins and Lacbon[®] (*Lactobacillus sporogenes*).

During feeding time we checking the heart beat, respiration and other clinical symptoms which may use.

3. Food Quality and Quantity

Syringodium isoetifolium was the last choice to feed dugong, because of its characteristic. One of them is a long storage and easy to get. The good condition of them is must, fresh and not too old.

Diana usually eats 2 kg every day or more. Uchida et al. (1978) reported an intake to body weight ratio of approximately 10% for dugongs.

Table 1. Total average food intake of Diana

Month/ Year	Total average food intake (kg)
December 2005	1,70
January 2006	2,54
February 2006	2,48
March 2006	2,30
April 2006	2,31
May 2006	2,87
June 2006	3,10
July 2006	3,50
Agustus 2006	4,00

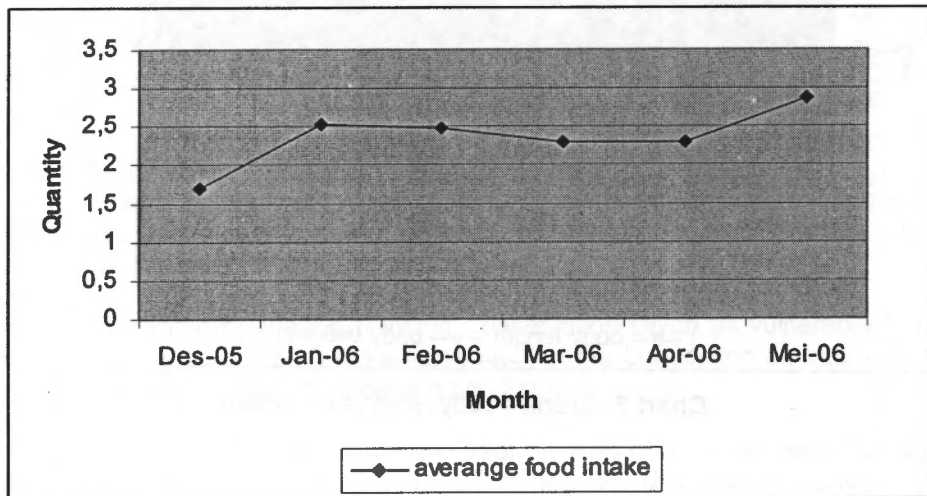


Chart 1. Total average food intake of Diana

4. Growth rates

Diana's body length when captured was 130 cm, it was estimated that she was 9 month old. From December 2005 to May 2006 she has 10 cm lengthen and 4 kg weight.

Table 2. Diana's Body Length and Weight

Month/ Year	Weight (kg)	Length (cm)
December 2005	38	135
January 2006	-	-
February 2006	39	138
March 2006	-	-
April 2006	40	140
May 2006	41	149
Agustus 2006	46,5	165

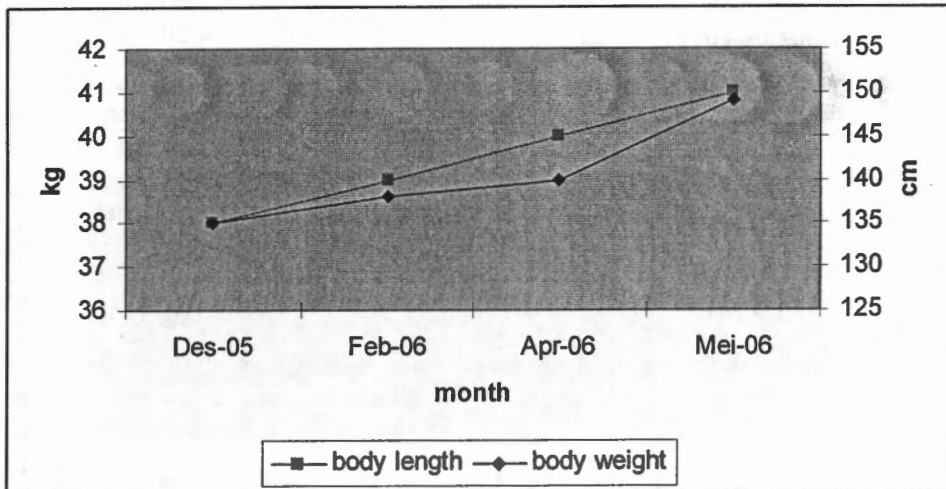


Chart 2. Diana's body length and weight

5. Medical

During 6 month there is some clinical sign which lead to several disease, most of them are digestive disorders and wound.

Table 3. Medical Record of Diana

No.	Clinical Sign	Diagnose	Treatment	Result
1.	Hardening of abdomen, floating buoyancy, no feces found, and irregular breathing.	Constipation, digestive disorders	<ul style="list-style-type: none"> • Dimethicone 25 cc add warm water eq. 200 ml • Vitamins K 1 tab • MgSO₄ 15 g add 100 ml • Bisacodyl 1 tab supp. • Inject. Oxytetracyclin 4 cc intramuscular Iodine 	Good buoyancy, good appetite, defecation ok.
2.	Wound in the extremities, hematome	Wound		Wound healing

Beside the medical treatment, we also do electrocardiograph (ECG) examination once a week and ultrasonography (USG) when needed to monitoring status health of her.

D. CONCLUSIONS

Dugong has depletion of their populations, only relic populations remain and these are separated by large areas where in dugong populations are either close to extinction or are already extinct.

The decreasing number of dugongs is caused by various threats. Direct threats include hunting and incidental catches which are prevalent throughout their range. Long term threats include pollutions, destruction of sea grass beds, and encroachment in coastal areas by the increasing human population and development.

The dugong is classified by the IUCN-World Conservation Union as vulnerable to extinction since 1982. The dugong is also listed in Appendix I of the Convention on International Trade in Endangered species (CITES) of wild Flora and Fauna.

In Seaworld Indonesia we keeps dugong and treat them as good as we can. Medical routine check, ECG, USG are some of our concern. Monitoring their daily activities and keeping good food always we do to make them survive.

In the 6 months Diana (our dugong) has increasing 4 kg body weight and 10 cm length, and in the good health condition.