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Blood Cells Profile of Maleo Bird (Macrocephalon maleo) Raised Ex-situ Conservation Captivity

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Abstract

The objective of the research was to identify the blood profile of maleo birds raised in ex-situ conservation captivity. The study used 6 day old maleo birds from incubator hatchery and reared in captive housing at Experimental Farm of Agricultural Faculty, Tadulako University, Palu, Central Sulawesi. The maleo birds is feed by chicken commercial feed ad libitum. The blood samples were collected from vena brachialis of 3 birds with 6 and 12 month old and were analyzed at the Office of Health Laboratory of Central Sulawesi province in Palu. The results showed that blood profile of maleo birds in 6 and 12 month old for each component were erythrocyte (2.25 and 2.95) 10^12/mm^3, leucocytes (10.55 and 16.30) 10^3/mm^3, H/L ratio (0.31 and 0.30), trombocyte (14.00 and 15.47) 10^3/mm^3, hemocrit (42.80 and 47.22%), hemoglobin (14.53 and 16.25) g/dl, protein plasma (3.04 and 3.77) g/dl, glucose (227.00 and 263.67) mg/dl, cholesterol (198.67 and 223.67) mg/dl, triglyceride (136.33 and 192.33) mg/dl. The blood profile of maleo birds raised in ex-situ conservation captivity commonly still in normal value of the birds blood and was not difference with the domesticated or wild birds in nature habitat.

Key words: maleo bird, ex-situ conservation, blood profile

Introduction

Bird maleo (Macrocephalon maleo) is one of the rare bird species and Sulawesi islands around it are found in lowland and hilly forests that live wild in nature, including Megapoda group (family Megapodidae) with genus Macrocephalon. Bird species are included in the category of endangered rare as a result of habitat destruction and poaching. Realizing the importance of the bird’s survival, especially in terms of culture, biodiversity, science and natural ecosystem components, then the animals are protected under the Decree of the Minister of Agriculture of the Republic of Indonesia No. 412/KPTS /UM/6/1970 and Agricultural Minister Decree No. 90/KPTS /UM/2/1997; then under Law No. 5 in 1990, the Conservation of Natural Resources and Ecosystems, which is emphasized again with the Minister of Forestry Decree No. 301/KPTS/II/1991 dan No. 882/KPTS/II/1992 and government regulation No. 7 of 1999, dated January 27, 1999 on Plant and Animal Preservation. Since the year 1990 based on the Decree No.Kep.186/44/1067/ RO/BKLH dated February 24, 1990 Maleo designated as Animal Mascot in Central Sulawesi province (LKSIDA, 2004).

One way to prevent the birds from extinction maleo is to conduct ex-situ conservation of breeding, which aims to maintain the sustainability and increased population. In captivity, animal health is a very important thing. To facilitate this will require a diagnostic indicator or animals through blood tests.

Maleo bird has been successfully breeding outside the natural habitat (ex-situ) as the Bird Park in Taman Mini Indonesia Indah; but no long-lasting, so that the process of treatment and examination of the bird’s health is important to be always maintained continuity. One way to check the status of health and environmental problems is to know the bird’s blood profile. Until now not many studies that reveal aspects of life outside habitat of maleo bird. Based on these facts so this research aims to get a picture of blood profiles to determine the health status for the breeding maleo birds outside the natural habitat can survive longer and reproduce so as to support preservation efforts outside the habitat (ex-situ conservation).
Materials and Methods
Research conducted in the cage experiment Facility of Agriculture, Tadakala University, Palu, Central Sulawesi as breeding place ex-situ conservation. Maleo of breeding birds is the result of hatching incubator using a tool in the laboratory and then kept in individual cages and given food and drinking water were controlled.

Blood profiles were observed physical and chemical composition of blood by using bird malco age 6 and 12 months each of 3 tails. Blood samples were taken from the wing vein (brachial vein). For the physical composition analysis, 1 ml blood was taken and then inserted into the first tube is filled with anticoagulant Ethileen Diamine Tetra Acetic Acid (EDTA) 10ul for 1 ml blood, whereas for chemical analysis was also 1 ml blood was taken and inserted into the tube closed meeting for taking the blood serum. Blood sample was taken to the laboratory for examination of blood profile analysis. Preparation and analysis of blood samples carried out in the Central Health Laboratory of the Provincial Health Office of Central Sulawesi in Palu. Observed blood profiles are erythrocytes, leukocytes, the ratio heterophil/lymphocytes, levels of hemoglobin (Hb), and hematocrit values (Packed Cell Volume), glucose, cholesterol, triglycerides, and total plasma protein (TPP). Analysis of blood cells counted manually but also compared with the results of the reading of Automated Hematology Analyzer tool Brand Myric 1B. Descriptively analyzed data based on observations.

Results and Discussion
The results of blood profiles maleo a breeding bird in ex-situ conservation is shown in Table 1.

**Erythrocytes.** The results illustrate that the number of erythrocytes maleo bird age 6 and 12 months respectively 2.25 and 2.55 (10^6/mm³). This value is still within the normal range in birds that have been reported by several researchers. In general, the number of erythrocytes in birds varies between 1.9 to 6.59 million/mm³ (Welty, 1979). In other bird species such as falcons from 1.43 to 2.03 million/mm³ (Santoso et al., 2003), chickens from 2.72 to 3.26 million/mm³, turkey 2.24-2.38 million/mm³, gooose 2.22-2.71 million/mm³, ducks 2.00-2.46 million/mm³, pigeon 3.07-4.00 million/mm³, pigeon 2.96-3.04 million/mm³ (Sturkie, 1976, and Myrcha et al., 1997).

The number of erythrocytes in maleo birds aged 12 months (2.55 million/mm³) higher than at the age of 6 months (2.25 million/mm³). This is in accordance with the statement Guyton (1994) that will increase the number of erythrocytes in accordance with the increase in age, it is because the increased need of oxygen in the body in the metabolic processes required for the formation of energy for purposes of growth.

The number of erythrocytes is one of the most important parameters to check on animal health, considering the very large role in transporting oxygen throughout the body. In general, the number of erythrocytes in blood circulation is affected by age, but also affected by temperature, age, and sex of birds.
sex, hormones and other factors such as season, daily time, ambient temperature and reproductive status (Sturkie, 1976).

Leukocytes. The number of leukocytes male birds at the age of 6 and 12 months respectively 10.5 ±
and 16.50 (10³/mm³). Value was lower when compared with the number of leukocytes of several
species of birds and domesticated poultry such as chickens (19.80 to 35.80) 10³/mm³, geese (16.80-27.00)
10³/mm³, turkey (16.00-26.80) 10³/mm³, quail (16.00 to 23.10) 10³/mm³ (Sturkie, 1976) and at the young
age of duck 11.05 ± 10³/mm³ age adults and 10.42. 10³/mm³ (Olayemi et al., 2003). On the eagle 6.20 to
28.00) 10³/mm³ (Santoso et al., 2003) and birds gelatik lower (2.04-2.60) 10³/mm³ (Suranta, 2003). Varied
the number of leukocytes in several bird species are expected due to environmental factors, physiological
characteristics and age of each type. Maxwell et al. (1993) reported that the content of the blood leukocytes of
birds affected by the nutrient content of feed, the main conditions, climate and environment.

Ratio heterophiles/lymphocytes (ratio: H/L) with a value of 0.30, including low when compared
with H/L from the value of pradige 0.78-1.13 (Yuwanta et al., 1994), 0.86 turkeys and geese 0.85
(Santoso et al., 1996). Value of H/L from the same bird on the relative male duck with a value of 0.32, pigeon
of 0.35, quail of 0.30 (Sturkie, 1976) and in broilers at the nursery with a value of 0.39-0.55 (Spinola et al., 2003).
This value is one indicator of stress (stress in poultry). Maxwell et al. (1992) and Maxwell et al. (1993) reported
that the ratio H/L and basophiles increased in the event of climate change, environment, and noise, which
gives the response to cell differentiation and mobilization.

Packed Cell Volume (Hematocrite). Hematocrit values in male male birds were in the range
42.80-47.22%. Matsuoka and Ransley (1981) states that the value of hematocrit at 30-45% quail, turkey 30.40-
49.60%, 39.30-59.40% pigeons, 23.35% of chicken, ducks 32.4-47%. In parrot ranges 32.81% (Burhanuddin, 2001),
falcons from 30 to 77% (Santoso et al., 2003), birds gelatik 53.58-67.50% (Suranta, 2004), the
Nigerian local chicken 32.25-34.22% (Dorotaye et al., 200) and broiler 31.35-35.02% (Alfan et al., 2003).
The range of male birds hematocrit values did not differ much with some of these bird species.

Hemoglobin (Hb). The results of determination of blood in the range of male
birds 14.53-16.25 g/dl. Normal hemoglobin values in several species of birds are chicken (8.90-9.70) g/dl,
turkey (10.83-15.20) g/dl, geese (11.30-15.70) g/dl, duck (12.70-15.20) g/dl, quail (10.70-15.80) g/dl
(Sturkie, 1976). Hb values in birds male relatively high when compared with several types of birds
species, environment, feed, and the nature of the physiology of each species. Fowler (1986) states that
several factors that affect blood hematocrit levels of age, gender, muscle activity, psychological
conditions, seasons, air pressure and living habits of the species.

Total Plasma Protein (TPP). Observation of the
Figure 1. Levels of glucose, cholesterol and triglycerides (mg/dl) of blood male birds aged 6 and 12
months of the breeding in ex-situ conservation.

The results showed that there are differences in
blood glucose levels in the two age groups, this is
carried by the body's metabolic rate is influenced by
different factors and one of them is the age factor. Foldenauer et al. (2007) reported that the breeding of
wild birds have differences of blood glucose levels between young age with an older age. Normal levels
of glucose in the blood serum of birds are in the range of 200 - 500mg/dl, but in a state of stress can increase glucose levels doubled (Freeman, 1987). Blood glucose levels in chickens were in the range of forest 275.66-337.14 mg/dl (Yuwanta et al., 1996). Further reported, that blood glucose levels are determined by the consumption of feed that is fed and hungry stimulation and stress caused by the existence of. If there is stress then activates the work of the lipase to break down triglycerides into fatty acids and glycerol which eventually formed the energy in the form of blood glucose (Freeman, 1987). Blood glucose levels in male birds still in normal range, meaning the maintenance male birds in captivity do not experience stress (stress) is high. This is shown also when finished taking the blood, male bird not appear weak or in pain, does not even look like anything happened, still active as before the blood.

Blood cholesterol. Blood cholesterol levels in birds that male 198.67 g/dl (6 months) and 223.67 g/dl (12 months). Results are relatively higher compared with blood cholesterol levels in the broiler in the range 147.00-164.50 mg/dl (David et al., 2007) and the Nigerian local rooster was lower in the range 104.6-113.3 mg/dl (Darutoye et al., 2000). According to Burdick (1976), chicken cholesterol content ranged from 116-134 mg/dl, the difference in blood cholesterol levels are influenced by heredity, age, and the feed provided.

Blood triglycerides. These results illustrate that blood triglyceride levels of 138.33 mg/dl (6 months) and 192.33 mg/dl (12 months). Triglyceride levels male birds is relatively higher than the Nigerian local chicken is in the range of 72.7-77.5 mg/dl (Darutoye et al., 2000), the partridge with a range of 88.85-154.58 mg/dl (Yuwanta et al., 1996). Triglyceride levels in blood are influenced by the synthesis of starch and fat by carbosynsy A comsezyme A activity (ACC) and fatty and synthetase (FAS), the two enzymes is decining in line with reduced lipogenesis. If there is rapid growth and high triglyceride levels is also increasing. It is also used Adenosine-tri-phosphats (ATP) levels of blood, which is an important role in the formation of the body's energy and has the same relationship with triglyceride levels of growth rate.

Conclusions

General picture of the blood male birds breeding outside the natural habitats are still in the normal range blood of birds in general, this indicates that health status is still good. Based on the results of this study can be concluded that the breeding male birds can outside the natural habitat to support wildlife conservation efforts that are not extinct.

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