

CARE MANAGEMENT OF MAMBRUK (*Goura Victoria*) AT THE BIRD AND ORCHID PARK (TBTA) BIAK NUMFOR, PAPUA

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ABSTRACT

More than 700 species of avifauna found in New Guinea including Indonesia and Papua New Guinea. Bird and Orchid Park (TBTA) in Biak, an ex-situ conservation facility of Papuan endemic birds and captive breeding center where Crowned Pigeon birds are raised. A study on care management of *Goura victoria* (Mambruk) included food, cage and health management are carried out. This study is conducted to support the Master Plan for the development of TBTA as one of the Regional Technical Implementation Units under the Forestry and Environment Papua Province Office. Data was collected by structured interview to a caretaker of Mambruk and direct observations related to the management practices applied in the facility. This study indicates that feed given to Mambruk birds approximately 2.21 Kg for five individuals in average, or ± 442 g/individual, fresh, cut in the form of squares/dice, with specific smell characteristic of fresh fruit in brightly colored. Food is given once every day, between 08:00 WIT and 09:00 WIT, following the starting working hour at the TBTA Biak. Drinking water is available ad libitum. The cages used for breeding Mambruk birds in TBTA Biak are permanent cages made of wire iron for roofs and walls. Two types of cages are available, group and individual cages with supporting facilities such as eating and drinking places, roosting sites, places to make nests, trees and tubs for bathing. Eating and drinking places are cleaned before use. The environment around the cage in TBTA is quite clean. The design of the cage is quite safe for birds. It is concluded that the energy content and crude protein of food in TBTA Biak is very low which cannot meet its nutritional needs, thus food diversification is important to enrich the food quality. In general, cages and supporting facilities are met the requirements of proper management of the avifauna groups in the captive facilities. The cleanliness of the cage and its facilities needs attention in supporting the health of birds. It is also important to have active veterinarians, and regular health program including quarantine / isolation cages to ensure the health of the birds in TBTA.

Key words: *Goura Victoria*, Bird and Orchid Park, Biak, Papua

INTRODUCTION

In 2021, Burung Indonesia (2021) recorded about 1812 number of bird species in Indonesia are found in Indonesia. Beehler et al. (2001) found more than 700 species of avifauna found in New Guinea which categorized as 578 species breed on land and fresh water, 40 species of seabirds, 56 species of migratory birds from north of the equator and 34 types of migratory and nomadic birds from Australia and New Zealand. From the number mentioned previously, 209 species are endemic to Papua because they have their own uniqueness.

The status of bird populations is deteriorating, due to environmental pressures and human activities that continue to increase beyond conservation efforts, especially endemic birds. This led to place several species of birds into endanger status (Prawiradilaga, 2019). IUCN Red List Species reports that conservation status of the three species of crowned pigeons or Mambruk are *Goura cristata* (Vulnerable–VU); *Goura victoria* (Near Threatened–NT), and *Goura scheepmakeri* (Vulnerable–VU) (<https://www.iucnredlist.org/>). They are endemic birds in New Guinea, and have morphological beauty and unique behavior and the adorable attraction. As a consequence,

they are often hunted mainly kept for pleasure or hobby as a pet. Mambruk were also used as the official logo for the government of Manokwari Regency, to give respect of the beauty of these species. In addition, the relationship of the Mambruk bird with the history of Papua makes this bird a bird that is highly regarded for its existence, in addition to bird of paradise and cassowary.

Efforts to protect Mambruk, was made by the Indonesian government through a designation of Mambruk as protected species based on Law No. 5 of 1990 concerning Conservation of Biological Resources and Their Ecosystems and Government Regulation No. 7 of 1999 concerning Preservation of Plant and Wildlife Species, as well as the Regulation Ministry of Environmental and Forestry No 108/2018 about Protected Species of Flora and Fauna in Indonesia (Prayana et al, 2012).

According to Fahik et al. (2018) important factors that support the success of captive breeding consisting of three main components, including captive techniques (feed, number of productive parents, treatment time and capital), cage conditions (temperature and humidity) and human resources (experiences working on captive breeding facilities and knowledge of keeper). The

success of the captive breeding facilities is strongly influenced by the success in the adaptation process, including the efforts of managers in adjusting birds from nature to the captive environment as newly habitat of the species (Prayana et al., 2012). In general, the factors that influence the success of ex situ conservation include internal and external aspects of animal biology (Cita et al., 2019).

In order to maintain the existence and restore the population of Mambruk in their natural habitat, the protection or conservation of this bird is absolutely necessary. Bird conservation activities can be carried out *in-situ* (within their natural habitat), such as through species protection, habitat development, and population, and *ex-situ* conservation (outside their natural habitat) among others through breeding activities. One of the factors that determine the success of a conservation activity is the management strategies. The management of a captive breeding as *in-situ* approach needs to be considered in providing healthy animals they are able to breed sustainably to keep the stable population.

Bird and Orchid Park (TBTA) is one of tourist destinations as well as an *ex-situ* conservation facility of Papuan endemic birds in Biak, which was established in 1984. Previous survey was recorded seen individuals of Mambruk consisting of one individual *Goura cristata* and six individuals *Goura victoria*. Until recently, TBTA provided lots of educational aspects and research for students and lecturers in the Faculty of Animal Science Universitas Papua. Along the way, TBTA has become a serious concern for the Papua Provincial Government through integrated efforts for further development of this facility to support a conservation of biodiversity in Papua.

A Master Plan for the development of TBTA as one of the Regional Technical Implementation Units under the Forestry and Environment Papua Province Office was carried out on November 14, 2019. This event is conducted to gain more inputs and action plan for the development of TBTA in the near future. This study aims to observe and learn about the care management especially the technical aspects of care management including food, cage/housing, and health characteristics of Mambruk bird to support the development plan of TBTA.

RESEARCH METHOD

This research was carried out in TBTA Biak Jln. Raya Bosnik, Biak Numfor, Papua Province, between 18 October and 16 November 2021. Five individuals of Mambruk (*Goura victoria*) consisted of two adult males and three adult females were the object of this study.

This study investigated the management of raising Mambruk in TBTA based on feeding, housing and health management. Data was collected by structured interview to a caretaker of Mambruk and direct observations

(observations) related to the management practices applied in the facility.

The studied variables following Prayana *et al.*, (2012) were:

1) Feeding includes: the quantity of feed and drinking water, the time of feeding, water sources, and feed sources (warehouse, buy or plant).

2) Housing includes: material, size, shape, risk to health and condition / facility.

3) Health includes: a). Disease prevention which consists of: cleanliness of eating and drinking places, cleanliness of cages, health checks, observation of health risks, quarantine and observation. b). Treatment of diseases consisting of: a program of treatment and administration of vitamins.

All the observation were analyzed using descriptive statistics. The data obtained were analyzed and displayed in graphs or figures and tables. The description of quantitative data was supported and combined with a review of field notes from interviews and field observations as well as material from secondary data. In addition, an analysis of the situation was done using a contextual approach to explain events in the field. This analysis was important to obtain a complete description of the research location.

RESULT AND DISCUSSION

1. Quantity of Diets

Food provided to the birds were fruits and seeds (bananas, papaya and corn). Food that given was fresh, cut in the form of squares/dice, with specific smell characteristic of fresh fruit in brightly colored (Figure 1). In this study, type of diets that was given is parallel with the character of this species as fruit eater and grain eater. We observed, the composition of diets were dominated by fruits, and grains were not as much as fruits that fed to the birds. Though grains play an important role in the digestion of food for seed-eating birds.

Warsito (2010), mentioned that the feed preferred by Mambruk including water guava (*Syzygium* sp.), papaya (*Carica papaya*), banyan fruit (*Ficus* sp.), kersen fruit (*Muntinga* sp), and corn (*Zea mays*). According to Indasari (2002), diets supplied to *G. cristata* in Ragunan Zoo is papaya, water spinach, bean sprouts and grain feed. In Bandung Zoo, the feed given is papaya, banana, water spinach, bean sprouts, Hong Kong caterpillars and grain feed. Notanubun (2002) explains that the types of feed preferred by *G. Victoria* raised in back yard in Manokwari were successively peanuts, corn, soybeans and green beans. While based on the study of Prayana et al. (2012) type of feed for the Mambruk Victoria bird in MBOF Bogor consisted of brown rice, yellow milled corn, green beans, rice groats, mustard, bean sprouts, papaya leaves, and yellow young corn.

Different diets were given in different study sites indicated the usual type of diets provided by the management of the facilities, but also described the availability of feed ingredients in each site. For example, Hong Kong caterpillars are quite difficult to obtain in the Papua region to be given in certain quantities and regularly so they are not found in the menu given at TBTA Biak.

In terms of quantity the food approximately 442 g of food was given per individual while drinking water was given ad libitum. The feed given to Mambruk birds approximately 2.21 Kg for five individuals in average, or \pm 442 g/individual. At the MBOF Bogor, Mambruk Victoria is able to consume feed as much as 41.28 g /individual/ day (Prayana et al. 2012). Our study indicates that the quantity of feed consumed by Mambruk Birds in TBTA Biak 442 g/individual is more than in MBOF Bogor that just only 41.28 g /individual/. However, the higher quantity of feed does not guarantee that the nutritional requirements of the animals are met. It is believed that the low diversification of the feed given and feeding based on existing availability, not based on the nutritional needs of the animal, causes the amount of feed consumed to be large. A study of Morrissey *et al.* (2014) found that poultry with restricted feed show high resting and walking behavior because the bird is still hungry.

In this study, assessment of the feed quality was not performed yet, we only observed the physical appearance of the feed ingredients given to the birds. Based on the physical appearance, the feed is still fresh, characterized by typical smells of fresh fruit, and have a bright color. Estimates of the nutritional composition of the three types of feed given to Mambruk Victoria in TBTA Biak according to Abun (2006) and the Direktorat Budidaya Ternak Non Ruminansia (2010), presented in Table 1.

The minimum amount of energy required by poultry is 2,900–3,200 kcal and the minimum protein in poultry is 10–30% (Sudaro and Siriwa, 2007). Our study shows that the amount of energy content and crude protein of food provided in TBTA Biak is very low which cannot meet its nutritional needs.

Source of water coming from a well / groundwater located in the middle of the bird park location. Feed bins and drinking cups were regularly cleaned before feeding. The need for drinking water is sufficient for the bird, where it is provided on ad libitum basis. This is in line with the study of Dwiyanto (2020), which states that the administration of drinking water to birds should be given ad libitum to anticipate the shortage of drinking water. Water performs so many biochemical vital functions in the body, as well as one of the main conditions for the continuation of life processes.



Figure 1. Type of feed provided to Mambruk bird at TBTA Biak

Table 1. Nutritional content of diets given to the birds in TBTA Biak

Diets	Nutrient content per 100 gram			
	Energy (Kcal)	Protein (gram)	Fat (gram)	Fibre (gram)
Banana	112.00	1.30	0.37	2.30
Papaya	46.00	0.50	0.00	1.70
Corn	176.99	0.46	0.20	0.10
Total	334.99	2.26	0.57	4.1

2. Feeding Time

Food is given once every day, between 08:00 WIT and 09:00 WIT (Figure 2), following the starting working hours at the TBTA Biak. Notanubun (2002) explains that feeding time of the Victoria crown pigeons in ex-situ captivity reach its peak from 06.00-07.30 WIT in the morning, while it starts from 05.30 to 07.30 WIT. Although feeding time is closely related to habits, at TBTA, the feeding time is too late.

Naturally, birds feeding all day 53.7% in the morning and 46.3% in the afternoon. Some studies showed that birds are mostly active searching for food early in the morning. Most birds start eating more from 7 AM to 10 AM, reaching their peak at 10 AM. They will actively return to foraging at late afternoon (Chia, 2020). Further it is explained that weather, season and whether the birds are nocturnal or diurnal are factors that influenced bird feeding time.

The average temperature at the study site was 30.52oC and humidity was 67%. High ambient temperatures can cause heat stress so that poultry will tend to reduce feed consumption, increase water consumption and spend more time to rest as part of their effort to adapt with the ambient temperature (Tamba et al., 2019).

Rahmawati et al. (2017) reported that poultry tends to reduce feed consumption during heat stress conditions and increase eating activities when environmental conditions are comfortable. Lambey et al. (2015) explained that feeding activities are carried all day when the environmental condition is conducive. Research by Diarra and Tabuaciri (2014) stated that feeding during a comfortable environmental condition tend to increase feeding behavior and compensate the nutrients lost during the period of non-feed.

Poultry will perform behavior according to environmental conditions in order to meet feed requirements, therefore feeding management must be adjusted to environmental conditions and behavior patterns. Feed must be provided when the animals need

to eat or when the ambient temperature is comfortable, so they will actively and comfortable consume their food (Tamba et al., 2019).

3. Water and Feed Sources

The source of clean water used in TBTA Biak comes from well located inside the TBTA (Figure 3), with clear water quality and taste a bit salty. The of animals in TBTA whose drinking the water from well did not show any abnormal behavior or symptoms of illness. Intensive observations were carried out during the study at TBTA.

The water consumed by mambruk animals is classified as brackish water as it contains 0.5 to 30 grams /liter salt. TBTA is located close to the coastal sites approximately 100-200m from the coastline. Recent evidence suggests that some minerals in drinking water can have an adverse effect on the performance of broilers and growing laying hens. Commercially farmed poultry acquire a balanced diet. High level of certain nutrients such as salt in water in the form of sodium and chloride ions, can negatively affected performance of the birds (Sudradjat and Riyanti, 2019).

The source of feed comes from warehouses/storage located within the TBTA areas. Feed is provided by the contractor UD Cahaya, three times a week. Storage is one of the factors that determine the quality of feed. We observed, the warehouse has been equipped with air conditioning (AC), in order to maintain the temperature and humidity appropriately. During a keeping process, fruit is stored at low temperatures to reduce the rate of respiration that affects the physical quality of fruits (Figure 4).

The use of low temperatures is important for storing various types of fruit to keep them fresh and slow down the rate of respiration (Pantastico, 1993). According to Akilie (2020), the physical properties of California papaya fruit was affected during a storage at 15oC for three days.



Figure 2. Eating activities of Mambruk Victoria at TBTA Biak

4. Cages

Mambruk birds in TBTA Biak are raised in the permanent cages made from iron wire. There are two type of cages (Group cage) with size, 6.30 x 4.20 x 4 m, occupied by two individuals and (Individual cages) 3.52 x 4.40 x 2.5 m. Each cage has supporting facilities of feeding site (30 cm x 20 cm) and drinking (20 cm in diameter with a capacity of 5 liters), roosting sites, places to build nests, trees and tubs for bathing. According to Beno and Ohee (2008), the relative temperature and humidity in accordance with the optimum temperature and humidity requirements for the life and development of Mambruk Victoria are in the range of 25 – 32oC with an air humidity of 57 – 78%.

The cage in TBTA Biak (Figure 5), is smaller than MBOF, Prayana et al. (2012). The cage at MBOF Bogor is rectangular, with 40 m long, 25 m wide, and 5m high, or 1000 m², without information available on numbers of birds within the cage. The construction and supporting facilities are relatively similar. The cage construction at MBOF Bogor is permanent with a semi-open roof. The wall is constructed with concrete at the lower part followed by iron with a diameter of 5 cm above, and a roof is built from wire. In the cage, supporting facilities are provided such as a place to eat and drink, roosting site, nests and ponds for bathing.



Figure 3. Wells as a source of drinking water facilities at TBTA



Figure 4. Feed of Mambruk within the storage at TBTA



Figure 5. Cages of the Mambruk birds

Housing is about the physical aspects related to cages, facilities and infrastructure that important to support and maintain the condition in within the cage or captivity (Syarif and Sumoprastowo, 1985). Permanent cage construction for keeping the Mambruk bird has more benefits in terms of being used longer than a wood or bamboo cages which only lasts 3-4 years (Warsito 2010).

5. Health

In general, disease prevention and disease treatment in TBTA are less than optimal. We observed that the cleanliness of the eating and drinking places and the surrounding environment in TBTA is quite clean. The eating and drinking places always washed before diets and drink water provided to the birds. However, cages are rarely cleaned. Only one caretaker handle all the tasks for Mambruk birds may affect the performace of the keeper. A keeper also acknowledged that Mambruk birds are still sensitive to the presence of anyone else around them.

During the study, we found that there were no health care activities and regular health check were ever carried out in Mambruk birds. We did not investigate the health condition of the birds, but all Mambruk birds did not show any symptoms of illness, such as less of appetite and reduced activity levels. We also did not see the birds were sitting/perching, panting and sleeping longer than usual, sneezing, yawning, vomiting food, or having diarrhea.

The absence of a veterinarian with special duties at TBTA Biak poses a risk to the health of Mambruk birds and other birds. In addition to the absence of a clear and regular health program, the treatment of sick animals also cannot be carried out immediately if there is no veterinarian on duty at the site. Yuliati (2020), states that birds are animals with a very high potential for stress compared to mammals. They are very easy to experience heart attacks, in the form of increased heart rate and breathing.

Proper diet is very important for overall health in any species, including birds. The right balance of vitamins, minerals, proteins, carbohydrates and fats that the bird needs will optimally maintain its health. Most birds love succulent feed. It is important that the bird must have access to clean water at all times. Given succulent feed, feed and drinking places should be washed daily with soap and hot water or running water to remove colonized bacteria.

The design of the cage and the materials used for the cage and its equipment look quite safe for birds. Birds are also quite protected from heat and rain. During the study we also did not see any other small birds act as reservoirs of the disease entered the cage. TBTA has no quarantine cages which are important for isolation and observation sites for new birds and/or birds that showing symptoms of illness.

Animal isolation is a biosecurity measure to prevent the spread of disease agents from infected animals. The availability of special insulating cages is very important as a measure to minimize and prevent contamination of diseases, so that the application of biosecurity is maximized. Isolation measures for sick animals are biosecurity measures that can reduce the risk of disease spreading among animals. An isolation cage is a cage used to carry out intensive observation measures and special treatment measures against some animals during the quarantine period. These cages are also used to place and handle livestock that have health problems. The insulating cage should be made separately from the maintenance cage (Swacita, 2017).

Birds need a clean and safe place. The cage should be made of non-perishable materials and all materials used in construction should be non-toxic. The distance of the bars of the cage should be such that the bird cannot insert its head through the bars of the cage. The construction of the cage floor should allow feces and uneaten food to fall past it (Yuliati, 2020).

CONCLUSION

1. Fresh fruits (bananas and papayas) are cut and provided in the form of squares/dice supplemented by corn. Food is given once every day, between 08:00 WIT and 09:00 WIT approximately 2.21 Kg for five individuals in average, or \pm 442 g/individual. Water is available *ad libitum*. The amount of energy content and crude protein of food in TBTA Biak is very low which cannot meet its nutritional needs, thus food diversification is important to enrich the food quality.
2. The cages in TBTA consists of individual cage (3.52 x 4.40 x 2.5 m) and group cages occupied by two individuals (6.30 x 4.20 x 4 m). They are permanent cages with supporting facilities such as eating and drinking places, roosting sites, places to make nests, trees and tubs for bathing. In general, cages and supporting facilities are met the requirements of proper management of the avifauna groups in the captive facilities.
3. The environment surrounding the cages in TBTA is quite clean. The cages design is quite safe for birds, although cages are rarely cleaned. Therefore, the cleanliness of the cage and its facilities needs attention in supporting the health of birds. It is also important to have active veterinarians, and regular health treatment program including quarantine / isolation cages to to ensure the health of the birds in TBTA.

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