

Conference Paper

Utilization of Sumbawa Tropical Forest Honey *Apis Dorsata* to Improve Fertility of Indonesia Oriental Magpie Robin (*Copsychus saularis*) as Effort Animal Population Inceasement

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Abstract

The objective of this experiment is to observe the effect of forest honey produced by giant bees *Apis dorsata* on improving fertility and egg number of the bird. The bird which observed in this experiment is captive bird Oriental Magpie Robin (*Copsychus saularis*). Twelve paired captive bird in official captivity were transferred into new pairing cage and adapted along two weeks. Every bird was fed with crickets and normal ration mixed with low protein diet (LP) with 16% of crude protein gradually. After an adaptation period, twelve paired captive bird were divided into three groups T₁, T₂ and T₃. Birds were treated with honey solution 5%, 10% and 15% concentration series in 1 ml aquadest intraabdominal of 10 crickets and fed with 15 crickets and 20 gram low protein ration (16%) per day for two laying periods. Egg production each group were calculated and observed its fertility among all egg production in one parental. In accordance with that, the results were analyzed descriptively. This pre-treatment, the bird's mating behaviour becomes a week faster than the normal period. Bird's fertility is also increasing with the provision of honey in the bird nutrition. In the bird's pairs in cage's number 9 and 10 have shown development by producing 3 fertile eggs after being treated with honey. In the previous period showed from 3 eggs only 1 being fertile. Honey has not been able to increase the number of eggs produced by birds. However, there is an enhancement in the animal population up to 25% of the 12 pairs of birds that are used as experimental samples in the captivity. The conclusion of this study shows that honey can accelerate the mating behaviour of birds and can increase the fertility of birds' eggs. However, honey has not yet affected the increase the quantity of the birds' egg. Longer observation's duration with extra bird's sample is needed for future research, in order to see the reproduction cycle of birds over several periods. Field research related to nutrition in chemistry nutrition's fields related the active ingredient in honey that can affect the reproduction system is also important to conducted for further research.

Keywords: Oriental Magpie Robin; Eggs Production; Fertility; Mating Behaviour; Honey.

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1. Introduction

Different with the others countries, Indonesia considers bird as a popular pet. According to the survey was conducted in six capital cities in Indonesia (Jakarta, Surabaya, Bandung, Yogyakarta, Solo and Denpasar) in 2010, it reports that one of three households in Indonesia tend to raise a bird in their home, and 2 of 3 households in Indonesia tend to have birds in their last ten years on [1]. The numerous number of rising bird as a hobby, the blooming of bird contest, the higher demand of bird in Indonesia, the lack of regulation to raise a legal bird from official captivity cause the population of bird rapidly decrease in Indonesia [2]. This condition was compounded by the higher number of animal abuse and exploitation in their habitat, that reaches 0,5–1% per years [3] and the lower rate of societies awareness about conservation is also one of the influencing factors in animal population in Indonesia [4].

The effort to increase the population rate of animals, a specific bird in Indonesia can be conducted by optimizing the production quality of the animal reproduction. Bird's lust is influenced by several factors. In several species, phenotype characteristic in the colony also influences the breeding rate sources [5]. A research report was written by [6], state that artificial light that induced in the birds head influences the reproductive system to develop earlier and faster rather than in normal system. Moreover, it is also indicated that the higher rate of photosensitization affects the ovum ovulation; besides that, the availability of feeds that supply the nutrients of the cell needs [7]. This is indicated by the higher number of birds and their egg is comparable to the higher rate of their nutrition in their food [7]; [8].

Nutrition management in captivity often does not meet the criterion, especially in the term of bird's physiological needs. Research by [9] in bird captivity shows that bird's nutrition with 20% of the protein was compared with the commonly used nutrition resulting significant egg production in the birds. On the other hand, environmental status with a higher rate of air pollution has been exposed to birds in captivity, and it leads to reproductive declination. Environmental toxicant and xenobiotic associated with stud's bird [10] cause oxidative stress made by reactive oxygen species (ROS) [11] and ROS (Reactive Oxygen Species) can damage oocyte and granulosa cell [12].

The oxidative stress can be treated using antioxidants. Antioxidants will release, suppress, and against ROS [11]. In addition, the substance that has highest antioxidant activity is honey. Honey has been known to have as many as 150 polyphenol compounds, including phenolic acids, flavonoids, flavonols, cetachins and cinnamic acid [13]. The most powerful flavonoids as antioxidants are flavone and cetachin. Moreover,

this is confirmed that the high content of the highest cethacin present in the forest honey produced by *Apis dorsata* [13]. In the body, these flavonoids will neutralize the oxidation of the radicals, making them more stable and less reactive. In other words, flavonoids stabilize ROS by reacting to a reactive radical compound [14].

Research about honey in relation to reproduction has been done with a positive result, it increases the number of spermatozoa, stabilize the spermatozoa normality and decreased abnormalities of the tail and spermatozoa head [15]. Honey can also provide fertility enhancement in animals that induced by cigarette smoke effect [16]. In females, honey can mobilize endogenous stem cells against impaired ovarian tissue [17].

In recent years there has been a lot considerable studies related to honey [18]. However, the studies of honey related to animal reproduction are still rarely conducted. The high risk of extinction of endemic species of Indonesia and the dominance of 70% of *Apis dorsata's* forest honey production in Indonesia [19] of 2000 tons per year compared with other honey in Indonesia [20] are the supporting factor to do this research related to the potency of honey in bird reproduction as study. Thus, the result of this study is expected to contribute to the preservation of endemic Indonesian animals, i.e bird preservation.

2. Materials and methods

This experiment was conducted in Safari Bird Farm Captivity, Kertosono Nganjuk, East Java for two laying periods.

Honey was obtained from Forest of Batulanteh Sumbawa Island and purchased from Sumbawa Honey Distributor. The Honey solution was screened for the bioactive compound in Assessment Service Centre Laboratory Airlangga University Pharmacy Faculty. *Apis dorsata* bees which produce honey sample were confirmed in Entomology Laboratory Tropical Disease Centre Airlangga University.

The ration was mixed and grinded in Animal Feed Laboratory Airlangga University Veterinary Medicine Faculty for 16% crude protein.

There are 12 paired Oriental Magpie Robin (*Copsychus saularis*) was adapted in pairing cage and given honey treatment which certified by Animal Care and Use Committee of Airlangga University Veterinary Medicine Faculty.

Treatments were done in 3 different groups. The 12 paired Oriental Magpie Robin was divided randomized into 3 groups T_1 , T_2 and T_3 then transferred into new pairing cage each couple. The 12 Captive birds were adapted for two weeks and feed normally

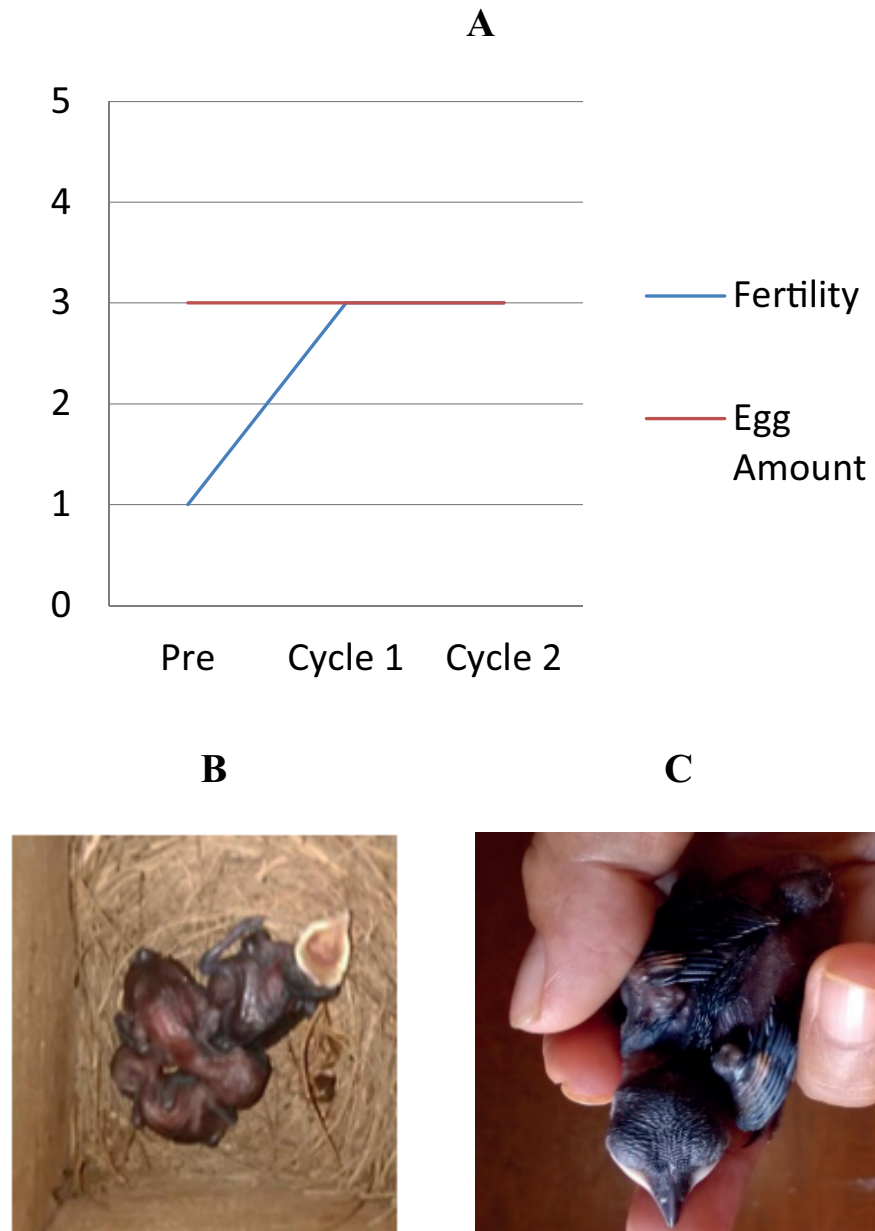


Figure 1: The increasing effect of 15% honey on fertility of bird and egg number **(A)**. Newly hatched chicks from captive bird's treated by 15% honey **(B)**. Six-day old bird chicks from the same bird before treatment **(C)**.

with 25 crickets without a honey solution. Every bird was fed with crickets and normal ration mixed with low protein diet (LP) with 16% of crude protein gradually. After an adaptation period, twelve paired captive bird were divided into three groups T_1 , T_2 and T_3 . Birds were treated with honey solution 5%, 10% and 15% concentration series in 1 ml aquadest intraabdominal of 10 crickets and fed with 15 crickets and 20 gram low protein ration (16%) per day for two laying periods.

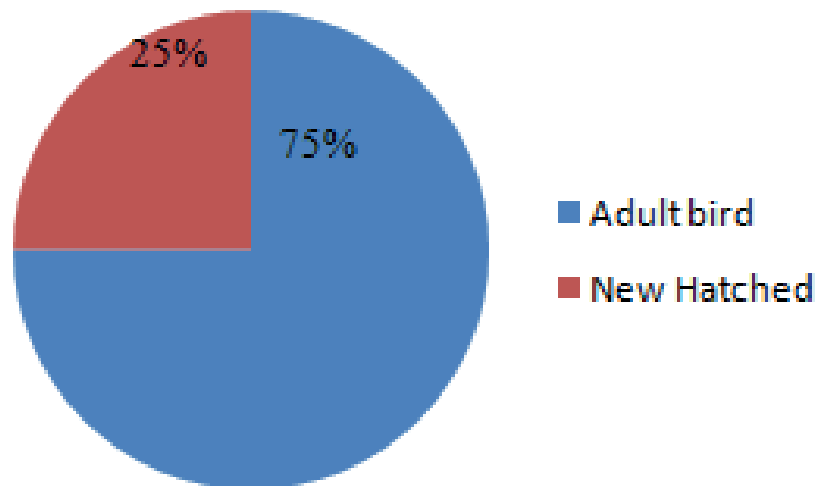


Figure 2: Pie chart comparison between new individual and adult bird.

Laid egg each group were accounted and observed in fertility among every laid egg for a paired bird each laying phase and it's mating behaviour with nestling activity acceleration as an indicator. Data were analyzed descriptively.

3. Results

In the experimental group, an increasing of egg fertility was observed 3 times in T_3 than previous (**Fig.1**). The fertility increasements in T_3 were observed for two laying periods. Fertility increasements in T_1 and T_2 were not found. The number of eggs in each bird was not any alteration.

An increasing population in captivity for two laying periods were reached to 25% for new individual **Fig.2**

An acceleration mating behaviour was reported. The most immediately mating behaviour was found in T_3 . The slowest mating behaviour was found in T_1 after transferring into new pairing caged **Fig.3**

Honey was able to improve newly born individual according to [21] compare with vitamin E. In the pre-treatment of experiment data shown two paired captive bird in cage 9 and 10 were laid 3 eggs each couple and the only one which fertile. Bird's fertility is also increasing with the provision of honey in the bird nutrition. The honey solution with 15% concentration increases the egg fertility at the same bird. It has shown development by producing 3 fertile eggs after being treated with honey. In the previous period showed from 3 eggs only 1 being fertile. It indicates that honey could

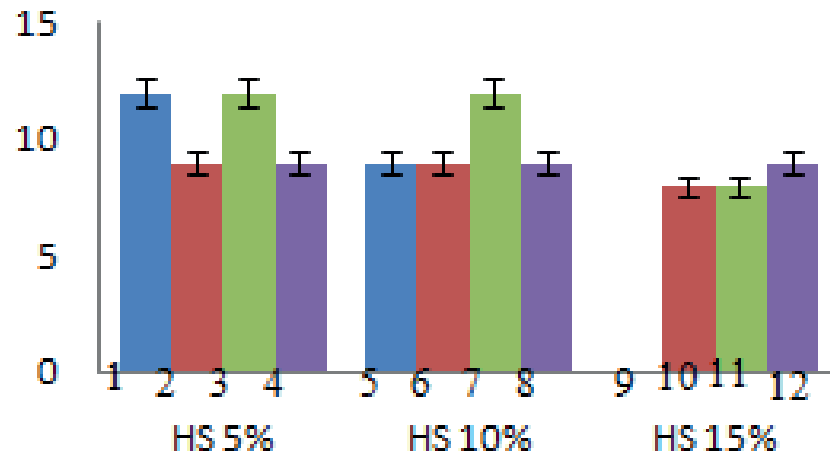


Figure 3: Acceleration for mating behaviour (day) in 12 paired captive bird *Copsychus saularis*.

improve the fertility of bird. This result was in line with other studies that honey could improve the health of reproduction [22], [23].

Low protein diet was a factor that able influence the succeeded of reproduction [7]. According to [24], low protein diet decreased hatchability and egg production. In contrast with the quantity number of egg, honey solutions with three gradual concentrations were not giving any alteration. Honey has not been able to increase the number of eggs produced by birds. This is indicated by the absence of increasing the number of eggs in the pre-treatment period, or after being treated. However, there is an enhancement in the animal population up to 25% of the 12 pairs of birds that are used as experimental samples in the captivity.

The present results were show alteration of mating behaviour. Hormone level was regulated the mating behaviour [25]. A captive bird that is in form of giving honey, the bird's mating behaviour becomes a week faster than the normal period. This result suggests that honey absolutely can speed up the period of mating behaviour of birds. It contradicts with the result of [23] that honey doesn't influence the level of hormone which regulates the mating behaviour. Honey can increase the fertility of Indonesian Oriental Magpie Robin's egg but it can't increase the quantity of egg production in one parental. Honey consumption improves the animal population in captivity. Honey can accelerate the mating behaviour of birds.

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