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**Improvement Reproductivity of Jalak Bali (*Leucopsar rothschildi Stresseman*)
Balinese Rare Animal (Through the Method DNA Sexing and Improvement of
Feed Quality)**

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ABSTRACT

Jalak Bali population or Curik bali (*Leucopsar rothschildi Stresseman*) in nature is estimated to never exceed several hundred tails. In the 1960s hundreds of Bali Starlings were sent to the United States and Singapore. Then also to Europe. In the United States and Europe this breed is growing rapidly in a number of zoos. But in western Bali, the population is rapidly decrease to invite world attention and concern. The year 1966 has led the Bali Starling into an endangered species group in IUCN's Red Data Book as a type whose condition is classified as "critical" (Prana et al., 2006)

Breeding Jalak Bali at Surabaya Zoo (KBS) is currently quite encouraging but there has been no touch of technology yet from university researchers in Indonesia. Trying systems try from the KBS keeper should be given the basis of science and technology cultivation is more intensive. For example how to determine sex (sexing) is still traditional, namely by determining the differences contained in the parts - body parts, sounds and techniques "pendulum". Besides, the guarantee of the authenticity of captive breeding is also doubtful. Similarly, the feeding is still natural, as well as insect eggs (kroto), caterpillars, crickets and voer with a 22% protein content that is prone to contamination with disease agents or other toxic materials. Similarl hygiene of these feed ingredients is difficult to control.

The proposed study consists of two stages, each stage lasting for one year. The first stage (first year) includes the authenticity / purity test of Jalak Bali Jalak food and the way of sexing with DNA analysis methods. To test the authenticity / purity of DNA analysis performed from blood samples or feathers Jalak Bali from several breeding locations and existing in nature. Sexing is done in a traditional way compared to DNA analysis (PCR). The second stage of research (second year) is the improvement of Bali Starling reproduction with improved quality of feed from combination of natural ingredients with the addition of protein supplements such as lysine, methionine and vitamins processed in the form of granules or pellets can act as feed flushing. Can improve the reproductivity and productivity of Jalak Bali.

Keywords: Jalak Bali , extinction, sexing, DNA, flushing feed,

1. Introduction

Indonesia is one of the three main centers of global biodiversity (mega biodiversity centers) has species of fowl and bird not less than 1,537 species, or 17% of total bird species known in the world. 353 species of them are classified as endemic, because it can only be found naturally in Indonesia. In fact, many of these types of endemic species that have a very limited distribution area. One of them is the Jalak Bali. Jalak Bali or Curik bali (*Leucopsar Rothschildi Stresseman*) is naturally found only in the western part of the island of Bali, which is now more commonly known as the Taman Nasional Bali Barat (TNBB). Because of its popularity, especially the beautiful crested and the skin around the eyes like smeared "eye shadow" caused widespread illegal arrests. Over 17 years after the species was discovered (1911) by Stresseman Jalak Bali have been massive exported to Europe (Prana et al., 2006).

The population in nature estimated never exceeded a few hundred. In 1960 when population start increase, hundreds Jalak Bali is sell to the United States and Singapore. In the United States and Europe of this type multiply rapidly in some zoo. But in Bali Barat population is extremely decrease .it fact inviting Attention and global concerns. 1966 has led to the Jalak Bali into the group (Red Data Book) IUCN (International Union for the Conservation of Nature and Natural Resources). Following four years later (1970) this species have entered the list of Appendix 1 of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), which was ratified by the Government of Indonesia in 1978. In the same year (1970) by the Minister of Agriculture NO : 42 / SK / Kpts / Urn / 8/1970 on the Protection of Biological Resources and Ecosystems of this type to be protected. Various conservation and recovery effort immediately launched by the Government in collaboration with various stakeholders, including nongovernmental organizations (NGOs) and other institutions (zoos etc.), Both at national and international levels (Prana et al., 2006).

In this research proposal is expected to increase the quality of reproduction of endangered Jalak Bali (*Leucopsar Rothschildi Stresseman*) by methods Feed Flushing and Sexing. Detection of sex (sexing) in a population of Jalak Bali by

various methods, among others distinguish between the body part, head size, head shapes, coat color, body posture, the allocation of coat color, tail, noise and the use of techniques pendulum and DNA analysis of hair or blood to determine it accuracy.

2. Research Methods

2.1 Sexing

Various attempts to determine the sex of birds (sexing) morphology (males females showed no difference in appearance) has been performed. But there has been no standardization. The most common conclusion was the need for sexing method, which determines the sexes of birds based on the analysis forms part of the difference in male and female organs coupled with pendulum technique and DNA Sequencing. Mechanical pendulum introduced by Warsito in 1998 to have 100% accuracy. Use of a pendulum used ring circumference models 24 carat gold with a weight of 5 -10 grams and a diameter of 3 cm was given rope 20 cm. The tool is balanced above the cloaca. If there is a fixed circular motions is a female and male have a straight motion.

2.2 Estrus Stimulating of Jalak Bali Using Research Pellet

Estrus Stimulating giving Jalak Bali boiled eggs that have been crushed along with tofu and voer, in addition of fruit (papaya or banana) a dose of 10 g and insects such as caterpillars cage, Kroto, crickets and caterpillars tube alternately, a dose of 4 items/ day. Bird also have commont problem with difficult to pull out the egg (the egg binding). Bird with egg binding have a characteristic such as coat stand, belly bulge, and followed the behavior of birds silent, passive and prefer stay in cage. With adding 5 Watt lamp in a cage, as warmers and provide feed intake of high calcium to support muscle work, such as pounded eggshell duck and bone cuttlefish (squid). Accompanied by the administration of vitamin D3 that acoomplished absorbtion of calcium. Sources of vitamin D3 is obtained from sunlight can prevent egg binding.

2.3 Treatment Control and Data Analysis

Selected 20 pairs of Jalak Bali has done sexing, created two groups each of 10 pairs of treated natural feed such as papaya, banana, Kroto (ant larvae), caterpillar cage and crickets in accordance with the habit as control the entire amount of weight in grams dosed feed about minimum body needed and analyzed proximate each materials as a basis for making pellets with the same material.

10 pairs again treated research feed ad libitum a mixture of papaya, banana, Kroto (larvae of ants), caterpillar cage and crickets processed, mixed with the micro-vitamin mineral amino acid lysine, methionine and cysteine in the mixer pellets with a diameter of 4 mm and 0.5 cm long, dried in an oven 80° C .

Results of the study were observed are number of eggs produced, the number of children who hatched into life and sex are produced. Tabulated data were analyzed descriptively.

3. Results and Discussion

Stressmann (1912) classified Jalak Bali in phylum of (Chordata), Order (Aves), Family (Sturnidae), Species (*Leucopsar Rothschildi*) with a local name Jalak Bali/Curik Putih/White Jalak Putih Bali. The characteristics of Jalak Bali can be expressed such as:

3.1 Morphologic Examination

a. Feather

Most of the Jalak Bali white clean feather, except for the tail feathers and black spot of its wings.

b. Eye

Dark brown eyes, the area around the hairless eyelids with dark blue color.

c. Crest

Jalak Bali has a beautiful crest, both sexes of male and females.

d. Leg

Jalak Bali has a foot in gray blue with 4 fingers (one back and three forwards).

e. Beak

Part spike with 2-5 cm, with a distinctive shape where at the top there is the elevation of the flattened upright. Color blackish-gray beak with the tip of a brownish yellow.

f. Size

Difficult to distinguish Jalak Bali body size of males and females, but in general male have a larger body and has a longer pigtail than female.

e. Egg

Jalak Bali have a bluish-green oval eggs with an average of the longest diameter is 3 cm and smallest 2 cm.



Figure 1. Male and Female Jalak Bali Morphology

3.2 Anatomical measurement on Jalak Bali to determine sex

In the study, the size of the male head is larger and rounded and has longer pigtails than females. Males have sharper bones of supit/pubis and females are more flat and wide.



Figure 2. Anatomical difference of supit/pubis in male and female Jalak Bali.

3.3 Build a Nest

Nesting activities more commonly found in females Jalak Bali rather than males. Female Jalak will take the bark and collect it to make the nest. Female Jalak Bali using her beak to bite and peel the bark tree. Male Jalak Bali have a job to feed the female during egg period. But this is also not absolute because there are male Jalak Bali that also actively collect nest material.

3.4 Pubic Bone (Supit Urang) Palpation.

Jalak Bali have two pubic bones (Supit urang) on the hips. In the breeding season, the bones of the female Jalak Bali become more elastic and the distance between the two pubic bones is widened by hormonal influences. The situation can be felt with palpation. In male Jalak Bali, the distance between two pubic bones is narrow. This technique can only be used when the active sex appearance of the female Jalak Bali.

3.5 Laparoscopy Examination

Laparoscopy tool also can be used to examine the sex of Jalak Bali. Jalak Bali to be sex examined should be drug first. After that performed a small operation on the left side of the bird's body between the ribs, lumbar bone and thigh bone. From the operated section insert laparoscopy tool to see its ovary (ovary). If there is an ovary it is female confirmed. This method can only be used in adult Jalak Bali.

3.6 DNA Examination

Another method to find out the gender of Bali is using DNA test that can be obtained from blood or bird feathers. After the DNA is extracted with a certain solution and further process, then the result is photographed with Polaroid. If in the photo is seen two bands then the Jalak Bali confirmed to be female. But if you see only one band its male. This method is considered faster and the more accurate result. But the cost is very expensive. In Indonesia, there are not yet many laboratories offering services to check the sex of birds using DNA test.

So far, there has not been the most accurate bird sexing method except through DNA testing. Some breeders try to develop a method of sexing based on body characteristi and pubix bone palpation. However, in practice, it is not easy to apply in the field. The result was not able to guarantee 100 percent correct.

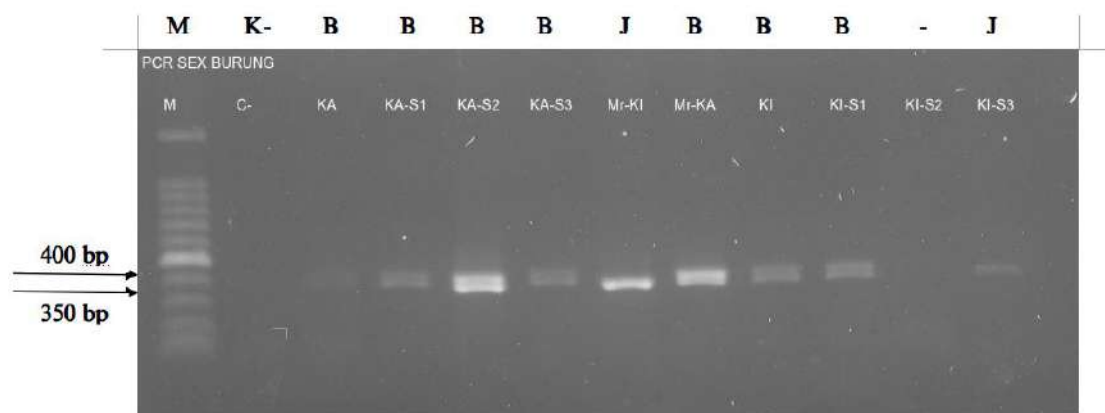


Figure 3. The Results of the sequencing of Jalak Bali DNA

Description:

M : Marker K(-) Negative Control B: Female J: Male

Methods PCR Amplification

The total DNA was extraction from the feather tips by using the Blood and Tissue kit (Qiagen, USA). A 330 bps fragment of the gene was amplified using species-specific primers : GPDF (5'-GGGGGTATACTATGCATAATCGTG-3') and GPDR (5'-AAAGAATGGGCCTGAAGCTAGT-3'). The PCR mixture and amplification were performed following the protocol (2011) using 35 cycles with the following condition : Denaturing at 94°C for 30 sec, Annealing at 57°C for 1 min, and Extension at 72°C for 1 min. And a final extension at 72°C at 20 min.

4. Conclutions

From the results can be found tentative conclusion that the determination of sex of male and female based on DNA test obtained 8 female and 2 male, while 1 negative. Based on the physical characteristics in the can be found 7 female and 3 Male. Further will be observed the Influence of food supplementation with a certain protein content to the reproductive power of Jalak Bali and Influence of amino acid administration by proximal calculation of Jalak Bali children growth

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