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The Effect of Feeding High Level of Protein on Reproductive Performance of Bali Starling

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Abstract

Bali Starling naturally found in the western part of Bali Island, is a critically endangered species. The research aim was to improve their reproductive performance of egg production and hatcthability by feeding various levels of protein. Twelve pairs of Bali starling were divided into 4 treatment groups i.e C (control, commercial feed); T1 (protein 17%); T2 (protein 18%); T3 (protein 19%). Feed were made from combinations of Gryllus mitratus, Oecophylla smaragdina's egg, Musa acuminata balbisiana, Zea maize, Arachis Hypogaea, Glycine max, Vigna radiate and fish powder. The result showed T3: 19% protein had better result for egg production and hatchability.

Key words : Bali starling, Fertility, Hatchability, Reproductive perfomance.

Bali Starling (*Leucopsar rothschildi*) is a bird that is very popular among the people because of the beauty of its physical form and brilliant blue eye frame. It was estimated that the population of around 300-900 birds in the wild in 1990 due to predators, the number decreased. Although as many as 126 birds have been released in the Bali Barat National Park on 2011, their survival was not monitered (Collar *et al*., 2012). This species has been the focus of much conservation effort and protected under Indonesian law since 1970 (Jepson, 2016).

Materials and Methods

Twelve pairs of Bali Starlings used in the experiment were devided in to three treatment using on protein content of 17% (T1), 18% (T2) and 19% (T3), prepared by using diferent feed inggredients using a combined method of trial and error and the Pearson square method to obtain protein content. In control treatment using commercial bird feed (C). The feed ingredients that were used as feed are analyzed for protein content at the Laboratory of Animal Food Sciences, Faculty of Veterinary Medicine, Airlangga University using the Kjiedhal method. All the treatment were fed 2 times a day, morning and evening in cages. It was observed the mating speed and eggs yield have increased (Hasib *et al*., 2017). The eggs were incubated for 14 days. Data analysis was done for hatchability of egg.

Results and Discussion

Nutrient contents of feed ingredients was summarized in Table I. The results of the proximate analysis conducted at the Laboratory of Animal Food Sciences, Faculty of Veterinary Medicine, Airlangga University, Surabaya.

From the results of the proximate analysis, the material was mixed using Pearson square method to obtain the expected protein levels as listed in Table II.

The results of research conducted from August to December 2014 at the Safari Bird farm in Kudu village, Kertosono Subdistrict, Nganjuk Regency, East Java, are presented in table III.

The treatment T3 has revealed better fertility in all the replicates, however the embryonic mortality was high in the two replicates of two each. The third replicate has yielded successful hatch all the three eggs set (100%). The hatchability in the other two replicates of T3 were only 33.3%. The all other treatment groups did not produce success in fertility or hatchability. The eggs from the other treatment groups had low fertility and higher embryonic

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Table I. Nutrient content of feed ingredients and compounded feed.

Raw Material	Nutrition (%)							
	Dry Matter (%)	Abu	Crude Protein	Crude Fatty	Crude Fiber	Ca	BETN	ME (Kcal/kg)
Compounded Feed	93.092	9.476	16.375	6.140	10.135	1.905	50.967	2886.693
Kroto	24.892	0.883	14.670	2.560	3.697	0.190	3.083	795.463
Crickets	26.257	1.280	16.283	3.857	4.828	0.591	0.406	846.792
Banana	41.774	0.926	3.554	14.787	2.266	0.712	20.241	1932.645
Corn	88.166	1.578	10.765	2.503	3.442	0.012	69.879	3117.61
Peanuts	92.277	2.174	26.300	12.990	12.727	0.681	38.086	3242.91
Green beans	92.373	3.365	23.453	3.451	4.932	0.183	57.172	3144.90
Soybeans	90.057	4.458	30.702	9.550	11.450	0.385	33.896	2984.92
Fish flour	-	-	44.754	-	-	-	-	-

Source : Laboratory of Animal Food, Faculty of Veterinary Medicine, Airlangga University

Table II. Feed composition of experimental rations / kg of feed

Material	C (Control)	T1 17%	T2 18%	T3 19%
Comercial bird feed	100	-	-	-
Crickets	-	2	2	2
Kroto	-	2	2	2
Banana	-	5	5	5
Fish flour	-	5	5	5
Peanuts	-	5	5	5
Green beans	-	10	10	10
Soybeans	-	14	19	23
Corn	-	57	52	48

Description: Per kg of ration plus 0.06 grams Introvit 4+ ws as a source of vitamins, minerals and amino acids

mortality.

The results obtained in this study were not significantly different of Balen *et al*. (2000). In the process of preserving the Bali Starling, the number of eggs produced is not only important, but also they should be fertile to preserve the Bali Starlings. The third treatment replicate the one had the highest fertility percentage with all the eggs hatched. In the control treatment, the production was 0 due to the fact that their feed does not have enough protein to support the egg production and fertility like might be the reasons.

There are several factors unsuccessful mating any immature sperm. Williams and Feistner (2006) states that egg fertility is influenced by sperm quality, parent age, their nutritional status, mating time, male-female ratio. Feed plays an important role in their production of eggs (Prasetyo and Safitri, 2016) and also for fertility and successful rearing of young ones. Dietary deficiencies (nutrition) can result in decreased sperm production, fertility and embryonic death (Safitri *et al*., 2016).

In hatchability study, The third treatment had an average value of 55.5%. All eggs on third treatment were fertile but some failed to hatch due to environmental factors and the lack of parental care, like cracks in the shells

Tabel III. Production and Hatchtability of Bali Starling Eggs

Treatment	Cage	Egg production	Fertility	Mortality	Hatch	Hatchability
	52	0	-	-	-	-
C (Control)	54	0	-	-	-	-
	63	0	-	-	-	-
	55	3	-	-	-	-
T1	60	2	-	-	-	-
	62	2	-	-	-	-
	53	2	-	-	-	-
T2	57	3	1	1	-	0%
	63	4	2	2	-	0%
	58	3	3	2	1	33.3 %
T3	59	3	3	2	1	33.3 %
	61	3	3	0	3	100 %

resulting poor hatchability

The egg quality increased with increasing protein level (Shell thickness, Haugh Unit and egg yolk weight percentage). Large eggs and thick shells will result in lower egg shrinkage during hatching so that they can increase hatchability. Thin shells with low Haugh Unit result in decreased hatchability. Similarly egg shells and egg yolks are a source of material for embryo development, so increasing egg shell thickness and percentage of egg yolk will have a bearing on the hatchability (North and Bell, 1990).

The second treatment had a hatchability of 0% even though there were sufficient number of eggs, there was high embryonic mortality due to nutritional deficiencies.

Summary

Rations with 19% protein produced more the number of egg Bali Starling and have high fertility, all the eggs produced were fertile and hatched, besides feed the climate and the level of parental care can also affect hatchability.

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