RESPONS OF *LEKANG* BABY TURTLES FED TUNA FISH *VS.* SHRIMP UP TO THREE MONTH OF AGE TO SUPPORT CONSERVATION

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ABSTRACT

This research was carried out to study the response of *lekang* baby turtles or Day old Turtles (DOT) fed tuna fish compared to shrimp for three months from hatched. The result of the study hopefully might support their conversation since this species was reported as endanger species. Completely randomized design was used in this experiment using five feed treatments (A, B, C, D And E) which were 100% tuna, 75% tuna + 25% shrimp, 50% tuna + 50% shrimp, 25% tuna + 75% shrimp and 100% shrimp respectively.

Statistical analysis showed that the average weight gain of baby turtles was significantly different among the all treatments where the fastest growth was showed by baby turtles fed 100% tuna (treatment A), while the slowest was the baby turtles in treatment E which were fed 100% shrimp. The baby turtles weight gains in treatment A, B, C, D and E were 0.79, 0.74, 0.63, 0.59, 0.52 g respectively. However, their feed consumption and feed conversion ratio mostly were not significantly different between the all treatments except for feed conversion ratio between treatment A and treatment E where baby turtles that fed 100% tuna more efficient than those fed 100% shrimp. This result was related to protein and energy consumption between the treatments and also related to protein and energy retention between those five treatments. The highest protein and energy consumption and also the protein and energy retention was shown by baby turtles fed 100% tuna and the lowest was shown by baby turtles by 100% shrimp. It was also found that width of the front flippers has close correlation with body weight ($R^2 = 0.74$ and $r = 0.86$) of the baby turtles. These flippers have an important function for swimming and diving because the baby turtles live in the sea.

It might be concluded that *lekang* baby turtles grew faster up to three months old when were fed tuna fish compared to shrimp. Their efficiency in using feed for growth similar between the all feeding treatments. There was a close relationship between the size of flippers and body weight of *lekang* baby turtles. Therefore, management of *lekang* baby turtles by feeding them with tuna fish up to three months of age might support conservation program of the turtle particularly *lekang* turtle as endanger species in Indonesia.

Keywords: Response, Lekang Baby Turtles, Nutritional Requirement, Conservation

INTRODUCTION

Decreasing population of *lekang* turtle (*Lepidochelys olivaceae*) in many countries in the world has been reported by many researchers such as Aureggi *et al*. (2004), Godfrey and Chevalier (2004), Gaos *et al*. (2006), Cornelius *et al*. (2007), Frazier *et al*. (2007) and Plotkin (2008). According to Gaos *et al*. (2006) mortality of baby turtles (DOT) mostly because of predation by predators since they are hatched in the beach until they are live in the sea. Therefore, a particular management is needed to conserve this species. All types of turtle have been conserved internationally by CITES (Convention on International Trade of Endanger Species of Flora and Fauna), and nationally by Indonesian Government through regulation no. 7 in the year 1999.

Conservation of turtle had been carried out by hatching their eggs artificially or naturally under the sand in the beach, and then after hatching baby turtles were put into the sea. However, this method showed less success, since many baby turtles can not survive in the sea and many of them dead because of predation by predators. To overcome this problem, baby turtles may need to be kept intensively until they are ready to compete in their environment in the sea. According to Nuitja (1997) and Wyneken *et al*. (2009) the front flippers of the baby turtles has an important function for swimming and diving, while the rear flippers for direction when they are swimming.

This research was carried out to keep the baby turtles intensively for three months by feeding them with two types of feed (tuna fish and shrimp) with different composition. The objectives of the research were to find out the best composition of the feed that give the best responses in growth, feed efficiency, consumption and retention of protein, energy and fat, and relationship between flippers size and body weight of the baby turtles at three months old.

MATERIALS AND METHODS

An experiment was carried out using *lekang* baby turtles which were kept intensively at Tanjung Benoa, Badung regency in Bali, Indonesia. A total of 75 baby turtles were used and randomly assigned in to five treatments and each treatment has five replicates of three baby turtles. Baby turtles were fed 100% tuna fish for treatment (A), 75% tuna fish + 25% shrimp (B), 50% tuna fish + 50% shrimp (C), 25% tuna fish + 75% shrimp (D) and respectively 100% shrimp (E).

Component and chemical composition of the feed treatments are shown in Table 1. Completely Randomized Design (Gomez, 1995) was used in this study consisted of five treatments as mentioned above, each treatments consisted of five replications with three baby turtles in each replications which were put in a bucket of sea water. Sea water was replaced every two days after their feces collected by filter paper.

All baby turtles were fed *ad-libitum* once a day every morning in place special feed. After every meal, feed residue was collected with filter paper. Baby turtles were weighed each week from the age of one week up to 12 weeks old. At the end of the study, variables such as body weight, flippers size and feed intake were

measured. Growth responses of baby turtles in the five feed treatments were presented in graph to show relationship between body weight and age. Final weight, weight gain, feed intake and feed conversion ratio were analyzed using analysis of variance and if the results were significant, it will be continued using Duncan New multiple range test (Steel and Torrie, 1980). The data were processed using *Costat* program. Exponential analysis was used to find out correlation between flippers size and body weight.

Table 1. Components and Chemical Composition of Feed Treatments at Lab Analysis

Feed Composition	Treatments				
	A	B	C	D	E
Feed Components:					
Tuna Fish (%)	100	75	50	25	0
Shrimp (%)	0	25	50	75	100
Chemical Composition:					
DM (%)	28.74	26.46	26.77	25.98	22.78
CP (%)	22.00	20.89	19.92	18.37	17.87
EE (%)	1.40	0.97	1.24	1.28	1.07
GE (k.cal)	1.28	1.24	1.27	1.27	1.14
Ash (%)	2.73	1.50	1.40	1.82	1.89
CF (%)	0.25	0.27	0.28	0.32	0.44

RESULTS AND DISCUSSION

In general the best response was shown by baby turtles that were fed 100% tuna fish and the worst were baby turtles fed 100% shrimp. Growth of baby turtles between the five treatments (A, B, C, D and E) is shown in Figure 1. The baby turtles fed 100% tuna fish grew faster than the other four treatments. Table 2 shows that the final weight of baby turtles at the age of three months and their live weight gain were significantly different ($P<0.05$) among the five treatments (A, B, C, D and E) and it seemed that the higher the components of tuna fish in the feed, the faster the growth of the baby turtles. Although feed intake between those treatments were not significantly different ($P>0.05$) on Table 2, the faster growth of baby turtles fed higher component of tuna fish than shrimp, was because of protein, energy and ash contents of tuna is higher than shrimp (Table 1). A treated hatchlings showed the highest growth response ($P<0,05$) than hatchlings were given other treatments, whereas the hatchlings were given treatment E showed the lowest growth response ($P<0,05$). According to Campbell and Lasley (1975) and Sturkie (1976) growth of animal is due to accumulation of protein and mineral in the body.

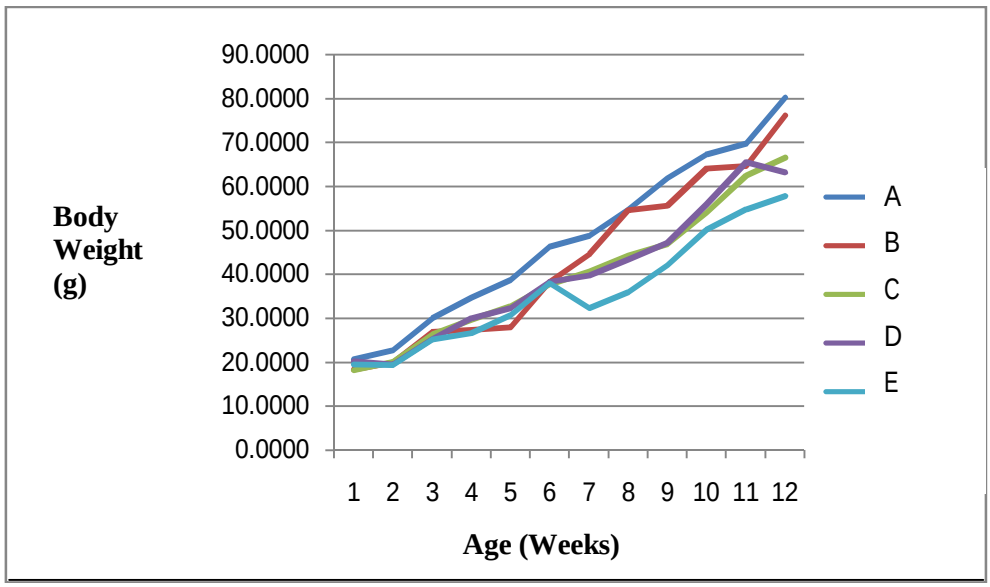

Figure 1. Growth of *Lekang* baby turtles fed five different feed compositions (A,B,C,D and E)

Table 2. Performance of *Lekang* baby turtles fed five different feed compositions (A,B,C,D and E) for 12 weeks

	Treatments				
Variables	A	B	C	D	E
Initial body weight (g)	14.93^{a}	13.40^{a}	13.07^{a}	13,33^{a}	13,33^{a}
Final weight (g)	80.30^{a}	76.26^{b}	66.67^{c}	63,20^{d}	57,82^{e}
Weight gain (g/d)	0.79^{a}	0.75^{b}	0.64^{c}	0,59^{d}	0,53^{e}
Feed intake (g/d)	3.10^{a}	2.83^{a}	2.93^{a}	2.85^{a}	2.37^{a}
Feed Conversion Ratio	4.04^{bc}	4.02^{c}	4.66^{ab}	4.86^{a}	4.53^{b}
Protein Intake (g)	0.68^{a}	0.60^{b}	0,59^{b}	0,53^{c}	0,44^{d}
Protein Retention(g)	0.14^{a}	0.13^{ab}	0,16^{a}	0,10^{bc}	0,09^{c}
Energy Consumtion(k.cal)	3.98^{a}	3.75^{ab}	3,68^{b}	3,58^{b}	2,85^{c}
Energy Retention (k.cal)	0.74^{a}	0.73^{a}	0,72^{a}	0,63^{ab}	0,52^{b}
Fat Intake (g)	0.04^{a}	0.04^{a}	0,03^{b}	0,03^{b}	0,02^{c}

Note: Numbers within rows with different superscripts are significantly different ($P<0.05$)

The differences in growth and live weight gain between the treatments might also because of differences in protein intake, protein retention, energy intake and energy retention particularly between treatment A (100% tuna fish) and treatment E (100% shrimp) where treatment A was significantly higher that treatment E ($P<0.05$) on Table 2. There was a consistent trend (Figure 1) that the higher the content of tuna fish in the feed, the higher the intake and retention of protein and energy in this type of baby turtles.

Analysis using exponential regression shows that the size of flippers has a high correlation with baby turtles body weight at 12 weeks old (Table 3). It meant that feeding management for a period of three months was needed for the baby turtles before they are released to the sea. Those baby turtles might be more survive in the sea since they are stronger with larger plastron and more importantly larger flippers which are needed to swim and diving, than newly hatched baby turtles released into the sea directly, because the organism's body has not grown completely. This method is especially relevant supporting turtle conservation program in Indonesia, not for the purpose conservation others.

Table 3. Relationship between flippers size and body weight in *Lekang* baby turtles

Variables	Exponen Regresion	R^2
Front flippers length	$Y= 18.733\ e^{0,146x}$	0.491
Front flippers width	$Y= 7.083\ e^{1,144\ x}$	0.738
Front flippers weight	$Y= 30.250\ e^{0,048x}$	0.744
Rear flippers length	$Y= 23.873\ e^{0,206\ x}$	0.242
Rear flippers width	$Y= 29.936\ e^{0,338\ x}$	0.101
Rear flippers weight	$Y= 24.124\ e^{0,133\ x}$	0.855

Note: Y= Flippers size
X= Body weight

CONCLUSION

It might be concluded that *lekang* baby turtles grew faster up to three months old when were fed tuna fish compared to shrimp. Their efficiency in using feed for growth similar between the all feeding treatments. There was a close relationship between the size of flippers and body weight of *lekang* baby turtles. Therefore, management of *lekang* baby turtles by feeding them with tuna fish up to three months of age might support conservation program of the turtle particularly *lekang* turtles as endanger species in Indonesia.

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