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Growth of *Pteropus alecto* bats (Chiroptera: Pteropodidae) in cages

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Abstract. *Ransaleleh TA, Wahyuni I, Kawatu M, Laatung S, Lambey L, Rembet UNWJ. 2022. Growth of* Pteropus alecto *bats (Chiroptera: Pteropodidae) in cages. Biodiversitas 23: 6313-6319.* Black Flying Fox (*Pteropus alecto*), known as Paniki yaki, is widely consumed by the residents of Minahasa, North Sulawesi, Indonesia. It is imported from outside the provinces of Gorontalo, Central Sulawesi, and South Sulawesi. The peak of selling bats in Sulawesi is during Thanksgiving Day and religious holidays such as Easter, Christmas, and New Year. Even though the conservation status of this species, according to the International Union for Conservation of Nature (IUCN), is of Least Concern, this species will one day become extinct due to continuous exploration without control. Conservation or cultivation is one of the efforts to preserve this type of bat. Cultivation will be successful when the growth of this mammal is outside the habitat. Therefore, research has been conducted on breeding this animal in cages using five bats. The bats had been taken from the captivity in Wanea Sub-district, Manado city, 58-533 days old. The fruits given as food are papaya, banana, and mango, and the variables measured were the amount of consumption, body weight gain, and morphometry. Furthermore, the data obtained were tabulated and narrated descriptively. The results showed that consumption of *P. alecto* 1,2,3,4 and 5 fruits were 110.64, 147.86, 192.61, 249.18, and 331.61 g/day, with body weight gain of 0.50, 0.53, 0.96, 1, 17, 1, and 50 g/day. The morphometric growth of *P. alecto* 1 was total body length 0.10, forearm 0.06, tibia 0.03, ear 0.01 and wingspan 0.08 mm/day. Sequentially, the morphometric growth of *P. alecto* 2 was 0.11, 0.07, 0.05, 0.01 and 0.12 mm/day, while *P. alecto* 3 was 0.29, 0.13, 0.06, 0.03, and 0.89 mm/day. The growth of *P. alecto* 4 was 0.19, 0.02, 0.02.0.01 and 0.89 mm/day, while *P. alecto* 5 was 0.20, 0.01, 0.01, 0.01 and 0.85 mm/day. In conclusion, the 1st and 2nd P. alecto were in early bone growth, while the 3rd *P. alecto* was in bone and meat growth, meanwhile, the 4th and 5th *P. alecto* were in meat and slow bone growth.

Keywords: Bats, body weight, consumption, morphometry

INTRODUCTION

Bats are mammals classified in the kingdom Animalia, subphylum Vertebrata, class Mammalia, and order Chiroptera. The order of Chiroptera is divided into two suborders, namely the Megachiroptera and the *Microchiroptera* (Amador et al. 2018). The suborder *Megachiroptera* has one family, Pteropodidae, containing *P. alecto* (Nowak 1994). Bats have a vital function in regulating the balance of ecosystems as agents of fruit pollination (Stewart and Dudash 2016; Aziz et al. 2017; Thavry et al. 2017; Lim et al. 2018; Rodriguez et al. 2019; Sheherazade et al. 2019; Ng et al. 2020; Baqi et al. 2021) and seed dispersal, which plays a vital role in forest regeneration and maintenance (Sarmento et al. 2014; Oleksy et al. 2017; Ashwin and Jayakumar 2019; Shah et al. 2021). However, bat meat is also used as a source of food by some people (Mildenstein et al. 2016; Suwannarong and Schuler 2016; Ransaleleh et al. 2020)

Wild animal meat may be eaten as halal food by the Minahasa people of North Sulawesi, Indonesia, particularly Christians. Types of wild animal meat consumed include bats (Ransaleleh et al. 2013; Ransaleleh et al. 2020), rats (Laatung et al. 2021), pigs forest (*Sus scrofa*) and Reticulated python (*Malayopython reticulatus*) in Manado used to call rice field snake (Latinne et al. 2020). The types of bats consumed include *Pteropus alecto*, known as Paniki yaki. *Pteropus alecto* meat can be found in traditional markets and supermarkets, especially during certain seasons such as thanksgiving, and religious holidays, namely Easter, Christmas, and New Year. Furthermore, *P. alecto* is traded in traditional markets, and supermarkets are imported from neighboring provinces, namely Gorontalo, Central Sulawesi, South Sulawesi, and Southeast Sulawesi. Until 2012, bats were imported by suppliers to North Sulawesi to be sold alive and put in cages made of woven bamboo, then transported using open vehicles for a distance of two to three days. Therefore, many bats died and experienced weight loss due to the stress of the journey. From 2012 to 2022, the suppliers brought bats to North Sulawesi for consumption in frozen form and packaged in styrofoam.

The body weight of traded bats varies between 515-679 g (Ransaleleh et al. 2013), and the survey in September 2021 showed that the weight of traded *P. alecto* bats varied from 300-500 g with the same ratio of males and females (unpublished). The number of bats imported at Christmas and New Year is 500,000 kg (Sheherazade and Tsang 2015) between 1,000,000 to 1,500,000 when 1 kilogram consists of 2 to 3 individuals. Latinne et al. (2020) reported that the number of bats traded in Sulawesi is estimated at more than one million individuals annually. There is no

information on the age of bats from variations in body weight that are hunted and traded. Furthermore, hunters do not consider bats' reproductive and growth status during hunting activities.

Even though the conservation status of the *P. alecto* species is of the least concern (Roberts et al. 2017), the population trend will decline, and sustainability will be threatened when the bats continue to be hunted. It is vital to think about actions and solutions for preserving bats following the impact of ecological function. One of the actions or solutions to be considered is the legal status and socialization of bats, conservation (Frick et al. 2019), and cultivation (Ransaleleh et al. 2021). For bat cultivation, many factors should be considered, namely behavior, feed, reproduction and growth. The growth of *P. alecto* in nature and captivity has not been scientifically informed in Indonesia. Therefore, research has been carried out on the growth of *P. alecto* at various ages in cages. The benefit is providing information on the harvesting age of *P. alecto* to facilitate the management of maintenance and utilization.

MATERIALS AND METHODS

Study area

This research was conducted in the Polii-Ransaleleh family captivity administratively located in the Lingkungan V of Wanea Village, Wanea Sub-district, Manado City, North Sulawesi, Indonesia, at coordinates 1º27'39" N and 124º50'33" E (Figure 1). The research was conducted for 6 months, from March to August 2022.

Procedures

This research used five pups *P. alecto*. They were progeny from adult males and females *P. alecto* that have been kept in cages since 2011 without growth records (body weight gain, size morphometry, and fruit consumption). *Pteropus alecto* was obtained from different ages and gender according to different times of birth. Sex, age, and initial body weight of the *P. alecto* used in this experiment were 1st female 58 days, 205 g *P. alecto*, 2nd male 79 days, 275 g *P. alecto*, 3rd female 133 days, 370g *P. alecto*, 4th male 447 days, 415 g *P. alecto* and 5th male 533 days 470 g *P. alecto* respectively. Furthermore, *P. alecto* 1 and 2 are still suckling on their mothers, while *P. alecto* 3 suckles occasionally. *Pteropus alecto* 4 and 5 are no longer suckling, and the separation of *P. alecto* 1 and 2 was based on when the bats could pick fruit and feed themselves in the cage. *Pteropus alecto* 5 was individually housed in a cage of Kaju wrapped and isolated with ram into five units. Each cage unit measures 75x50x50 cm (Length x Width x Height) and is equipped with a drinking container. The fruits given as food for *P. alecto* were ripe papaya (*Carica papaya*), banana (*Musa paradisiaca*), and mango (*Mangifera indica*). The bats consumed papaya daily, while bananas and mango were given occasionally (Ransaleleh et al. 2021; Ransaleleh et al. 2022). The research procedure is that the *P. alecto* was separated from the group cage, body weight was weighed, and morphometry was measured. In addition, *P. alecto* was weighed and measured morphometrically and placed in a cage unit. Temperatures were varied from 25 to 31ºC and humidity varied from 56 to 89% depending on the weather. The equipment in the cages was hanging feeders (made of plywood) and hanging water (from mineral bottles), which were hooked on the wall (made of wire). The research was conducted for one and five months of pre-study and data collection. Fruits as food ingredients are given daily in the afternoon and evening on an ad libitum basis.

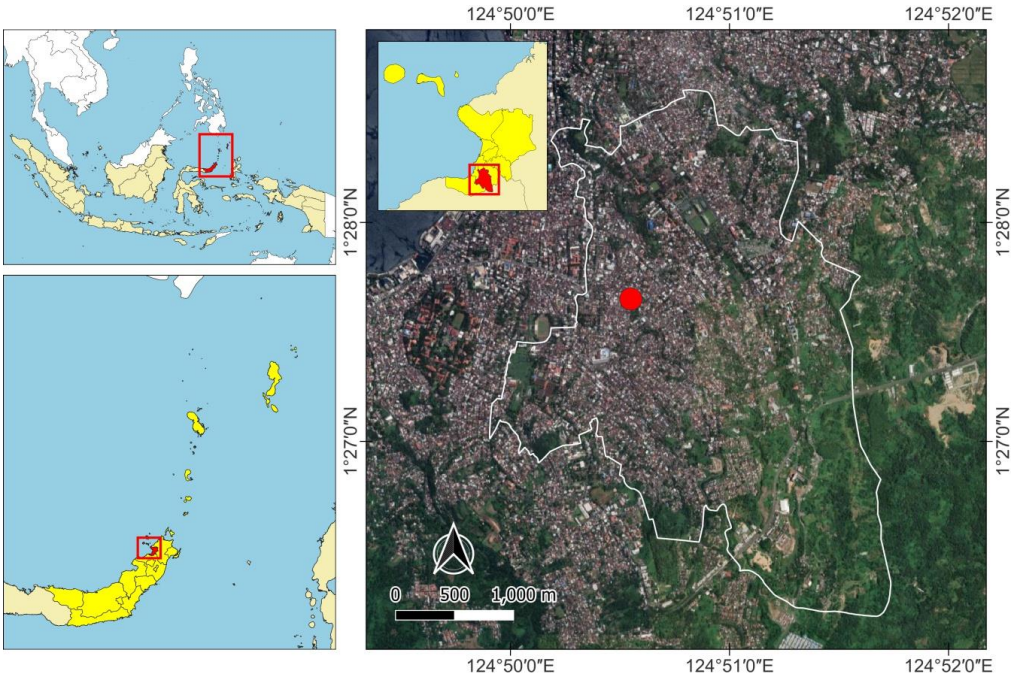

Figure 1. Research location for Environment V, Wanea Sub-district, Manado City, North Sulawesi Province, Indonesia. At coordinates 1º27'39" N and 124º50'33" E

Before the fruit is given, it is cut into pieces, weighed, placed in its container, and put into the cage unit. The rest of the fruit is weighed in the morning (Ransaleleh et al. 2022). Body weight and morphometric measurements were carried out once a week. The observed variables were the consumption of fruits per day, calculated from the number of fruits given minus those not consumed, and body weight gain (g), calculated from the initial and the final body weight. The morphometry (mm) assessment was performed once a week by weighing the body weight of the head and length, measured from the tip of the snout to the base of the tail. The forearm length was calculated from the tip of the elbow to the folded wings. The tibia length and ear were measured from the knee joint to the ankle and from the auditory meatus to the pinna (Wiantoro et al. 2016). Additionally, the wingspan was measured from the right to the left wingtips.

Data analysis

The fruit consumption data obtained were tabulated weekly and averaged daily. Data on weight gain were obtained from the final minus the initial body weight. Furthermore, the morphometric size was tabulated from the final minus the initial, and all data were presented in tabular form. The data obtained were narrated descriptively for the growth rate using a regression model.

RESULTS AND DISCUSSION

Consumption of *Pteropus alecto* bat fruit in cages during the research

Consumption of papaya, banana, and mango of *P. alecto* bats in cages during the research can be seen in Table 1. The types of fruit consumed by the *P. alecto* five bats were papaya, followed by bananas and mangoes. *Pteropus alecto* 1-5 bats widely consume papaya fruit containing 88.32% water. In contrast, bananas and mangoes contain less water at 65.16 and 77.5%.

Based on observations during the research, the bats took the papaya fruit when the fruit was given in the cage. They sniffed it for a few seconds, picked up the fruit with their claws and put it in the mouth, then chewed and swallowed the juice after the septum was removed. The bats were picked the fruit up again and again if the fruits were still available in the cage until they full enough. The leftover fruits are mostly bananas and mangoes. Since bats are born and kept in cages, the fruit often given daily as food is papaya. Therefore, they become accustomed to consuming this fruit, which is easily obtained and available. Bananas and mango are only combined with papaya fruit or occasionally given.

The total consumption of papaya, banana, and mango per individual per day of *P. alecto* 1-5 was 110.64 g, 147.68 g, 192.61 g, 249.61 g, and 331.61 g. The difference in the amount of fruit consumption per individual per day was due to differences in the initial body weight, where the initials were 205.00 g, 255.00 g, 370.00 g, 415.00 g, and 470 g. There have been no reports on the amount of consumption of papaya, banana, and mango in *P. alecto* per individual per day in their habitat and captivity. However, the research on fruit preferences consumed by *P. alecto* has been reported by Ransaleleh et al. (2022). Weber et al. (2015); Win and Mya (2015) stated that the types of fruits that are food for bats of the genus *Pteropus* include mangoes, papayas, and bananas.

The result is concerned with the habit of fruit consumption and the selection of the type consumed by bats daily. Additionally, body weight is closely related to the amount of fruit consumed in the cage *P. alecto*, with a low initial body weight, consumes less fruit. However, there are no scientific reports on the amount of fruit consumption at different body weights of bats. The results are basic information for selecting types and quantities of fruit in the conservation and management of *P. alecto*.

Table1. Consumption of *Pteropus alecto* bat fruit per individual in a cage during the research (grams)

Fruit type	*P. alecto* 1	*P. alecto* 2	*P. alecto* 3	*P. alecto* 4	*P. alecto* 5
Total consumption of papaya fruit	8015.00	13130.00	15180.00	28710.00	24970.00
Average consumption/week	400.75	656.50	759.00	1435.50	1248.50
Average consumption/day	57.25	93.78	108.43	205.07	178.36
Total consumption of bananas	4460.00	4295.00	8800.00	3135.00	17100.00
Average consumption/week	223.00	214.75	440.00	156.75	855.00
Average consumption/day	31.86	30.68	62.85	22.39	178.34
Total consumption of mango fruit	3015.00	3250.00	2985.00	3040.00	4355.00
Average consumption/week	150.75	162.50	149.25	152.00	217.75
Average consumption/day	21.53	23.21	21.32	21.71	31.11
Total consumption of papaya, banana, mango	15490.00	20675.00	26965.00	34885.00	46425.00
Average consumption/week	774.50	1033.75	1348.25	1744.25	2321.25
Average consumption/day	110.64	147.68	192.61	249.18	331.61

Body weight gain of *Pteropus alecto* bats in cages during the research

The weight gain of *P. alecto* in cages can be seen in Table 2. Table 2 shows that the body weight gain of each bat was different during the research. This was caused by differences in age and body weight of the *P. alecto* 5.

The age of *P. alecto* 1-5 bats at the beginning of the research were 58 days (1 month 28 days = 1.9 months), 79 days (2 months 19 days = 2.6 months), 133 days (4 months 16 days = 4.5 months), 447 days (1 year 4 months 11 days = 16.3 months), and 533 days (1 year 5 months 19 days = 17.6 months) with an initial body weight of 205 g, 255 g, 370 g, 415 g, and 470 g. After the research, the ages of *P. alecto* 1, *P. alecto* 1-5 were 189 days (6 months 18 days = 6.6 months), 219 days (7 months 8 days = 7.3 months), 273 days (9 months 3 days = 9.1 months), 587 (1 year 7 months 17 days = 19.5 months), and 673 (1 year 10 months 8 days = 22.3 months) with body weight at 275 g, 345 g, 505 g, 580 g, and 685 g. The growth rate of *P. alecto* 1-5 bats was closely related to the amount of fruit consumption described in the regression model. The result showed that the growth rate of *Pteropus alecto* 1-5 bats was closely related to the amount of consumption (Figure 2).

Generally, the amount of consumption is closely related to the growth of bats. This is indicated by the high value of R2 (index of determination) (close to the value of 1), ranging from 0.81 to 0.97. The value of R2 also shows that the model obtained is feasible to use, and 81-97% changes in growth can be explained by the amount of consumption. The resulting model shows the value of increasing growth for every 1 unit of consumption (variable x; gram). In *P. alecto* 1, 2, 3, 4, and 5 with the model y = 82.71 + 0.20x, y = 62.44 + 0.22x, y = 180.77 + 0.18x, y = 152.45 + 0.20x, and y = -546.45 + 0.48x, the increase was 0.20, 0.22, 0.18, 0.20, and 0.48 units. The *P. alecto* 5 regression model has a negative constant (a) value and is quite large. Therefore, a large amount of consumption (x>1000) can achieve a positive (+) growth value. The high level of *P. alecto* 5 consumption was due to having the largest body weight of 450 grams. The standard error ranges from 3.66 to 15.31 from the mean value. The error level in obtaining data is quite small due to relatively high accuracy. Based on the growth curve in Figure 2, it can be explained that growth is still ongoing until 22.3 months. Meanwhile, the age at the weight gain begins to decrease is unknown. Further research is needed to determine the sigmoid curve and the growth of bone, meat, and fat components of bats kept in cages.

Judging from the age, *P. alecto* 1 and 2 were still slow compared to the growth of 3 at 4.5 months of age, weighing 370 g (initial weight). *Pteropus alecto* 2 and 1 bats attained a body weight of 345 g and 275 g at the age of 7.3 and 6.6 months. The slow growth was because *P. alecto* 1 was 1.9 months old when separated from its mother, and *P. alecto* 2 was 2.6 months old and in lactation. Therefore, the growth became slow because the nutritional needs were not met initially. Todd et al. (2018) stated that the early growth of animals was focused on bone. The growth of animals under the availability of fewer nutrients will be affected. Vardon and Tidemann (1998) reported that the lactation period of *P. alecto* bats is 3-4 months.

Table 2. Body weight gain of *Pteropus alecto* in cages during the research

	Weight gain (grams)				
	***P. alecto* 1**	***P. alecto* 2**	***P. alecto* 3**	***P. alecto* 4**	***P. alecto* 5**
Initial body weight	205.00	255.00	370.00	415.00	470.00
Final body weight	275.00	345.00	505.00	580.00	685.00
Total body weight gain	70.00	90.00	135.00	165.00	215.00
Average weight gain/week	3.50	3.75	6.75	8.25	10.75
Average body weight gain/day	0.50	0.53	0.96	1.17	1.50

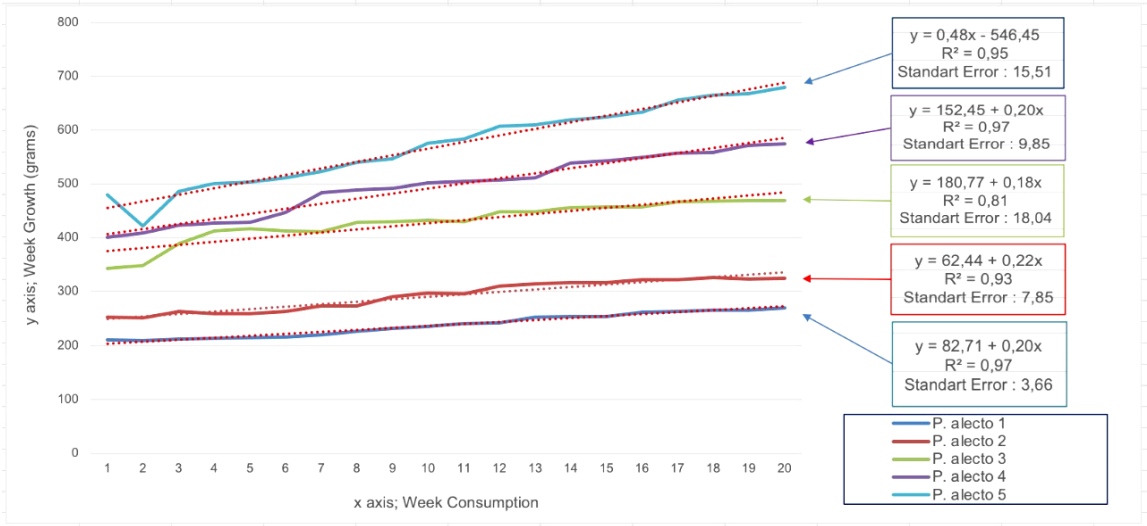

Figure 2. Growth model, the relationship between total consumption and growth week 1 to 20 of *Pteropus alecto* 1-5 in cages

Table 3. The increase in the morphometric size of *Pteropus alecto* in the cage during the research

Morphometric increment (mm)	*P. alecto* 1	*P. alecto* 2	*P. alecto* 3	*P. alecto* 4	*P. alecto* 5
Body length (head and body) at the beginning of the research	163.00	179.00	220.00	238.00	248.00
Body length at the end of the research	177.00	195.00	261.00	265.00	276.00
Increase in body length during the research	14.00	16.00	41.00	27.00	28.00
Average increase in body length/week	0.70	0.80	2.05	1.35	1.40
Average increase in body length/day	0.10	0.11	0.29	0.19	0.20
The length of the forearm at the beginning of the research	115.00	135.00	158.00	178.00	183.00
The length of the forearm at the end of the research	124.00	152.00	177.00	182.00	184.00
The length of the forearm during the research	9.00	11.00	19.00	4.00	1.00
The average increase in the length of the forearm/week	0.45	0.55	1.05	0.20	0.05
The average increase in the forearm/day	0.06	0.07	0.13	0.02	0.01
Ear length at the beginning of the research	26.00	26.00	27.00	32.00	33.00
Ear length at the end of the research	28.00	28.00	31.00	33.00	33.00
Increase in ear length during the research	2.00	2.00	4.00	1.00	1.00
Average increase in ear length/week	0.10	0.10	0.20	0.05	0.05
Average increase in ear length/day	0.01	0.01	0.03	0.01	0.01
Tibia length at the beginning of the research	52.00	58.00	60.00	70.00	75.00
Tibia length at the end of the research	56.00	65.00	69.00	74.00	79.00
Tibia length increase during the research	4.00	7.00	9.00	4.00	8.00
Average increase in tibia length /week,	0.20	0.35	0.45	0.20	0.20
Average increase in tibia length increase/day	0.03	0.05	0.06	0.02	0.01
Width of the initial wingspan of the research	790.00	850.00	990.00	1120.00	1130.00
Width of the final wingspan of the research	801.00	867.00	1115.00	1240.00	1250.00
Increase in the width of the wingspan during the research	11.00	17.00	125,00	120.00	120.00
Average increase in wingspan/week	0.55	0.85	6.25	6.00	6.00
Average increase in wingspan/day	0.08	0.12	0.89	0.85	0.85

The total body weight gain of *P. alecto* 3, 4, and 5 was 135g or 6.75 g per week or 0.96 g per day, 165 g or 8.25 g per week or 1.17 g per day, and 215 g or 10.75 g per week or 1.50 grams per day, respectively. This research provides information and illustrates that at 9.1-22.3 months, *P. alecto* bats kept in cages can achieve the same body weight as the species taken in the wild. Meanwhile, bats under nine months of age cannot achieve weight loss. The bodies of bats marketed for consumption are the same as those taken in nature/habitat, especially when the infants are separated from their mothers under the age of weaning. Ransaleleh et al. (2013) reported that the body weight of *P. alecto*, which is hunted in the wild and traded for consumption, ranges from 508-679 g. However, the results reported by Ransaleleh et al. (2013) did not provide information on the bats' age. To obtain maximum growth, young *P. alecto* bats cannot be separated from their mothers under three months. During this period, young bats still need their mother's milk which is rich in nutrients and needed in early growth.

Morphometry of *Pteropus alecto* bats in cages during the research

Measurement of morphometric characters is useful in determining the unique characteristics possessed by an animal, including bats. The characteristics of *P. alecto* bats include head, forearm, tibia, ear, and wingspan length. The morphometric characteristics in the research can be seen in Table 3.

The morphometric characteristics provide information that *P. alecto* 1 bat aged 1.9 months has a total body length (body + head), forearm, ear, tibia, and wingspan length of 163.00 mm, 115.00 mm, 26.00 mm, 52.00 mm, and 790.00 mm, respectively. After being reared separately from the mother for 144 days, the 6.6-month-old brood had a total body, forearm, tibia, ear, and wingspan length of 177.00 mm, 124.00 mm, 56.00 mm, 28.00 mm, and 801.00 mm. Likewise, *P. alecto* 2, separated from its mother at the age of 2.6 months, had a body, forearm, tibia, ears and wingspan length of 179.00 mm, 135.00 mm, 58.00 mm, 26.00 mm, and 850.00 mm. After 7.3 months of age, it has a total body, forearm, tibia, ears, and wingspan length of 195.00 mm, 152.00 mm, 65.00 mm, 28.00 mm, and 867.00 mm.

The morphometric characteristics of *P. alecto* 1 and 2 bats are very much different from *P. alecto* 3, which have an age difference of 2.6 months and 1.9 months. At the beginning of the research, 4.5 months old *P. alecto* 3, had 220.00 mm body length, 158.00 mm forearm length, 60.00 mm tibia length, 27.00 mm ear length, and 990.00 mm wingspan. After 9.1 months of age, it has a total body length of 261.00 mm, forearm length of wings of 177.00 mm, tibia length of 69.00 mm, length of ears of 31.00 mm, and a wingspan of 1115.00 mm. The difference in the morphometric characteristics of *P. alecto* 1, 2, and 3 was

used as research material, where *P. alecto* 3 had passed the breastfeeding period. Therefore, the growth of bone size was faster because the nutritional needs were met. Meanwhile, *P. alecto* 1 and 2 were still in the suckling period, which still needed nutrients from the mother's milk, hence their growth was slow.

Differences in morphometric characteristics were also seen in *P. alecto* 4 and 5 when compared with 3. At the age of 16.4 months, *P. alecto* 4 had a total body length of 238.00 mm, a forearm length of wings 178. 00 mm, tibia length of 70.00 mm, ear length of 32.00 mm, and wingspan 1120.00 mm. After age 19.5 months, there is a total body length of 265.00 mm, forearm length of the wings of 182.00 mm, tibia length of 74.00 mm, ear length of 33.00 mm, and wingspan for the forearm of 1270.00 mm. Similarly, *P. alecto* 5, at 17.6 months, had a total body length of 248.00 mm, forearm length of 183 mm, tibia length of 75 mm, ear length of 32 mm, and a wingspan of 1130 mm. At 22.3 months, the bat had a total body length of 276.00, forearm length of 184 mm, tibia length of 79.00 mm, ear length of 33 mm, and a wingspan of 1250 mm. The age difference between *P. alecto* 4 and 3 was 7.3 months, while that of *P. alecto* 5 and 3 was 8.5. However, the difference in total body length was only 23-33 mm higher than *P. alecto* 3, while the forearm, wingspan, tibia, and ear length is only 1.00 mm lower, with a difference in wingspan at 130.00 mm.

The growth of *P. alecto* 1, and 2 morphometric characteristics was still slow, while *P. alecto* 3 grew fast and started slowly for *P. alecto* 4 and 5. Therefore, the bat separated from its mother at the age of 58-79 days will experience slow growth. The rapid growth of morphometric characteristics occurs in bats that are no longer suckling at the age of 4.5-9 months but slow down at 16.4-22.3 months. This is identical to the measurement of the body skeleton, and in animal theory, post-natal growth begins with bone, followed by meat and fat gain. These results inform that *P. alecto* 1 and 2 bats are in the bone growth stage, while *P. alecto* 3 are in the bone and meat growth stage. *Pteropus alecto* 4 and 5 are in the flesh growth stage, with slowed bone development.

The detailed and complete morphometric characteristics have not been reported scientifically. Some studies only reported one of the morphometric characteristics, such as body length, forearm, ears, and tibia, but were not accompanied by age and body weight information. On the contrary, the information submitted in scientific journals only mentions body weight and does not inform the morphometric characteristics. Flannery (1995) reported that the body, forearm, and calf length was 219-278 mm, 156-185 mm, and 68-75 mm, with unknown age and body weight. Vardon and Tidemann (1998) also stated that the forearm length of 109, 136.6, 140.4, 141.7, 142.3, 143.4, 145.3, 149.5, 149.5, 152.6, 155.3, and 157.7 are for 0.7-0.8, 2.8-3.0, 3.5-3.6, 33.5-36, 3.7-3.9, 3.8-4.0, 4.5-4.6, 45.5-5.6, 5.7-5.8, 6.5-6.6, 5.7-5.8, 6.5-6.6, 7.5, and 8.4-8.5 months. Ransaleleh et al. (2013) reported that the body weight of bats from nature/habitat sold for consumption ranged from 508-679g, with a forearm length of wings 154.67-166.11 mm, calf 73.93-77.22 mm, and ear 32-32.53. However, the age of the bats on body weight and morphometry are not known. These results are beneficial to complete information on the morphometry, age, and body weight of *P. alecto* bats. The growth of morphometric variables, such as forearm wing and tibia length, grew rapidly at 4.5-9.1 months. The separation was conducted at the age of four months and adult bats can be used for meat at 16.4-22.3 months. This research concludes that *P. alecto* 1 and 2 were in the early growth phase, while *P. alecto* 3 was in bone and meat growth. Furthermore, *P. alecto* 4 and 5 were in a meat growth phase, and the bone growth experienced a slowdown seen from the body weight gain and the amount of consumption.

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