IBJ
Indonesian Biodiversity Journal
http://ejurnal.unima.ac.id/index.php/ibj

indonesian.biodivers.j.
Vol. 3, No. 3: 30-34
ISSN : 2722-2659

MORPHOMETRY OF EAGLE SPECIES (FAMILY ACCIPITRIDAE) AT BALI BIRD PARK

Iriani Setyawati [1]*, L.P. Eswaryanti Kusuma Yuni [2], Retno Kawuri [2], Ni Made Suartini [2], Ni Wayan Sudatri [2], I Gede Agus Pradana Putra[3]

[1] Biology Study Program, Faculty of Mathematics, Natural and Earth Sciences, Universitas Negeri Manado, Indonesia.
[2] Biology Study Program, Faculty of Mathematics and Natural Science, Universitas Udayana, Indonesia.
[3] Bali Bird Park, Gianyar, Bali, Indonesia.

**Corresponding author: irianisetyawati@unima.ac.id*

Received: October 22, 2022 *Accepted: December 10, 2022*

Abstract

This study measured the morphometry of raptor species (Family Accipitridae) in Bali Bird Park (BBP) namely *Nisaetus cirrhatus* (Changeable Hawk Eagle), *Elanus caeruleus* (Black Winged Kite), *Spilornis cheela* (Crested Serpent Eagle) and *Haliaeetus leucogaster* (White Bellied Sea Eagle). Measurements were made with meter tape and caliper on birds that were in their resting period. Raptor at BBP generally rest for 6 months until experience molting before being retrained for 4-5 months, then the birds will be ready to perform bird show for the next 9-12 months. Our measurements obtained the largest bird was *Haliaeetus leucogaster* with a total body length of 75 cm, wings length 83.5-85 cm, tail length 26 cm, head size (8 cm length and 7 cm width), upper beak (8 cm length and 2.5 cm thick) and lower beak (3 cm length and 1 cm thick), lower limb length (femur 17 cm, tibia 9 cm, metatarsus 11 cm, middle toe 6.5 cm and grip 9 cm). The smallest bird was *Elanus caeruleus* with a total body length of 33 cm, wing length 39-45 cm, tail length 19 cm, head size (8 cm length, 5.5 cm width), upper beak (2.5 cm length and 0.5 cm thick) and lower beak (1 cm length and 0.3 cm thick), lower limb length (femur 8 cm, tibia 4 cm, metatarsus 5 cm, middle toe 3 cm and grip 5 cm) The morphometry of the species *Nisaetus cirrhatus* and *Spilornis cheela* were between the two other bird species.

Keywords: Accipitridae, bird show, eagle, mophometry, raptor.

INTRODUCTION

Bali Bird Park (BBP) in Gianyar, Bali is a tourist destination that has the most complete bird collections in Bali island, including several raptor species. Bali Bird Park is divided into regions that recreate the natural habitats of its birds, complete with indigenous plant life, and plays a key role in protecting and conserving Indonesia's endangered wildlife. Bali Bird Park have successfully bred many species, including the rare Pesquet's Parrot and numerous Bali Starlings, bred mainly to support local release programs. Bali Bird Park accommodate more than 40 species of protected Indonesian birds in the park, a growing number of which are now breeding successfully including the raptor species.

Bali Bird Park features bird attractions including The Basic Insting show which also features several

indonesian.biodivers.j.
Vol. 3, No. 3: 30-34
ISSN : 2722-2659

raptor species. The show birds must meet the ideal body weight and be given standard food to support their training and attraction activities. The raptor ideal body weights for bird show are 2200-2400 g (*Haliaeetus leucogaster*), 1100-1500 g (*Nisaetus cirrhatus*), 200-300 g (*Elanus caeruleus*) and 900-1000 g (*Spilornis cheela*).

Haliaeetus leucogaster (White Bellied Sea Eagle) is one of the top-order predator in coastal environment. This species is recognized as indicator species by which the wilder- ness quality and environmental integrity are measured (Dennis et al., 2011). The population of *Haliaeetus leucogaster* is decreasing due to illegal hunts and trading, deforestation and other human activities. They distributes all across Indonesian archipelago, Australian coastal areas and the Philipines. However, the appearance and abundance in the densely populated coastal areas are still poorly studied (Debus, 2008).

RESEARCH METHODS

Measurements were made with meter tape and caliper on birds that were in their resting period from four raptor species from family Accipitridae in BBP namely *Nisaetus cirrhatus* (Changeable Hawk Eagle), *Elanus caeruleus* (Black Winged Kite), *Spilornis cheela* (Crested Serpent Eagle) and *Haliaeetus leucogaster* (White Bellied Sea Eagle).

RESULTS AND DISCUSSION

Nisaetus cirrhatus (Changeable Hawk Eagle), *Elanus caeruleus* (Black Winged Kite*), Spilornis cheela* (Crested Serpent Eagle) and *Haliaeetus leucogaster* (White Bellied Sea Eagle) were four raptor species (Family Accipitridae) in Bali Bird Park (BBP). The measurement results are showed in Table 1.

Table 1. Measurements of morphometry of raptor species (Family Accipitridae) in Bali Bird Park.

Species	Total Body Length (cm)	Wing Length (cm)		Leg (cm)					Head (cm)		Beak Length (cm)		Beak Thick (cm)		Truncus Length (cm)	Tail Length (cm)
		Right	Left	Femur	Tibia fibula	Meta tarsus	Midle Toe	Grip	Head Width	Head Length	Upper Beak	Lower Beak	Upper	Lower		
Nisaetus cirrhatus (dark phase)	55	48	45,5	12	5	9	5	-	7	7	5	4,5	1,5	0,5	43	27
Nisaetus cirrhatus (light phase)	60	59	57,5	17	8,5	12	5	-	6,5	9,5	5,5	4	1,5	0,5	54	26,5
Elanus caeruleus	33	39	45	8	4	5	3	5	5,5	8	2,5	1	0,5	0,3	36	19
Spilornis cheela	57	60	59,5	13	8	10	5	-	7,5	9	5	1,5	1,5	0,5	55	27
Haliaeetus leucogaster	75	83,5	85	17	9	11	6,5	9	7	8	8	3	2,5	1	77	26

Discussion

Our measurements obtained the largest bird was *Haliaeetus leucogaster* and the smallest bird was *Elanus caeruleus.* The morphometry of the species *Nisaetus cirrhatus* and *Spilornis cheela* were

indonesian.biodivers.j.
Vol. 3, No. 3: 30-34
ISSN : 2722-2659

between the two other bird species (Figure 1).

Figure 1. Measurements of morphometry of raptor species (Family Accipitridae) in Bali Bird Park. Source: Personal Documents

Haliaeetus leucogaster in BBP had a total body length of 75 cm, wings length 83.5-85 cm, tail length 26 cm, head size (8 cm length and 7 cm width), upper beak (8 cm length and 2.5 cm thick) and lower beak (3 cm length and 1 cm thick), lower limb length (femur 17 cm, tibia 9 cm, metatarsus 11 cm, middle toe 6.5 cm and grip 9 cm). The body of *Haliaeetus leucogaster* is mostly covered in white and grey. In the dorsal part of the body, the white feathers cover the chin, throat, breast, belly, thigh, flank up to the tail. According to Retnaningtyas et. al. (2015). The morphometry of *Haliaeetus leucogaster* in BBP in general comparison with the same species showed that *Haliaeetus leucogaster* in BBP was bigger in some parts of the body than species in other researchs (Retnaningtyas et. al., 2015; Wiwoho et al., 2007). Those parts includes the body length, total wing length, however, the tail length was smaller.

Elanus caeruleus in BBP had a total body length of 33 cm, wing length 39-45 cm, tail length 19 cm, head size (8 cm length, 5.5 cm width), upper beak (2.5 cm length and 0.5 cm thick) and lower beak (1 cm length and 0.3 cm thick), lower limb length (femur 8 cm, tibia 4 cm, metatarsus 5 cm, middle toe 3 cm and grip 5 cm). *Elanus caeruleus* is a small diurnal bird of prey in the family Accipitridae best known for its habit of hovering over open grasslands in the manner of the much smaller kestrels. *Elanus caeruleus* is distinctive, with long wings; white, grey and black plumage; and owl-like forward-facing eyes with red irises. They are not migratory, but show nomadism in response to weather and food availability (https://avibase.bsc-eoc.org/).

In our research, *Nisaetus cirrhatus* (dark phase) had a total body length of 55 cm, wings length

indonesian.biodivers.j.
Vol. 3, No. 3: 30-34
ISSN : 2722-2659

45.5-48 cm, tail length 27 cm, head size (7 cm length and 7 cm width), upper beak (5 cm length and 1.5 cm thick) and lower beak (4.5 cm length and 0.5 cm thick), lower limb length (femur 12 cm, tibia 5 cm, tarsometatarsus 9 cm, and middle toe 5 cm). *Nisaetus cirrhatus* (light phase) in BBP had a total body length of 60 cm, wings length 57.5-59 cm, tail length 26,5 cm, head size (9.5 cm length and 6.5 cm width), upper beak (5.5 cm length and 1.5 cm thick) and lower beak (4 cm length and 0.5 cm thick), lower limb length (femur 17 cm, tibia 8.5 cm, metatarsus 12 cm, and middle toe 5 cm). According to Clark et al. (2019), the two characteristics (crested and crestless) along with dark brown colour and streaks, adult *Nisaetus cirrhatus* generally have a total body length of 51-82 cm, a weight of 1300-1900 grams and a wingspan of 100-160 cm.

We found that the dark phase of *Nisaetus cirrhatus* in BBP has a dark brown body with a black stripe on the tip of its tail, it looks contrasted with the tail part which is brown and lighter. Meanwhile, the light phase species has a white upper body, patterned blackish elongated, as well as strips on the eyes and mustache that has a blackish color. In addition, Partasasmita et al., 2016 stated that *Nisaetus cirrhatus* has cultural value by its eagle-characteristics which represent its significant value for cultural diversity like Balinese and Javanese people.

Spilornis cheela in this research had a total body length of 57 cm, wing length 59.5-60 cm, tail length 27 cm, head size (9 cm length, 7.5 cm width), upper beak (5 cm length and 1.5 cm thick) and lower beak (1.5 cm length and 0.5 cm thick), lower limb length (femur 13 cm, tibia 8 cm, metatarsus 10 cm, and middle toe 5 cm). The characteristics of *Spilornis cheela* are the dominant fur color of the dark brown upper part of the body, and the lower part of the body is grey brown with white spots. Although this species has large range, *Spilornis cheela* is protected by Indonesian Law. *Spilornis cheela* is often seen flying high and making a distinctive sound, it is this loud, shrill and shrill when flying over trees or when calling to each other (MacKinnon et.al., 2010).

The feed given at Bali Bird Park for raptor to meet requirement energy and body weight is DOC (Day Old Chicken), beef, white rats, and vitamins. DOC has enough calorie content for the needs of eagles and calcium in bone DOC is useful for raptor in the process of growing nails and claws, besides DOC feathers are useful as hairball on birds that are vomited every morning. Freshwater fish or sea water fish can be given, but sometimes fish lenders will cause digestive and respiratory tract infections in raptor birds.

CONCLUSION

The largest bird in this study was *Haliaeetus leucogaster* and the smallest bird was *Elanus caeruleus*. The morphometry of the species *Nisaetus cirrhatus* and *Spilornis cheela* were between the two other bird species.

indonesian.biodivers.j.
Vol. 3, No. 3: 30-34
ISSN : 2722-2659

REFERENCE

Clark, W. S., Boesman, P., & Marks, J. S. 2019. Changeable Hawk-Eagle (*Nisaetus cirrhatus*) In: del-Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A., & de-Juana, E. (ed), Handbook of the Birds of the World Alive Lynx Ed. (Barcelona) .

Debus, S.J.S. 2008. Biology and Diet of the White-bellied Sea-Eagle *Haliaeetus leucogaster* Breeding in Northern Inland New South Wales. *Australian Field Ornithology* 25: 165-193.

Dennis, T. E., Mclntosh, R.R. & Shaughnessy, P. D. 2011. Effects of Human Disturbance on Productivity of White-Bellied Sea-Eagles (*Haliaeetus leucogaster*). *Emu, 111, 179-185*.

https://avibase.bsc-eoc.org/species.jsp?avibaseid=97C47F3E1BA4129A

MacKinnon, J., Phillips, K., & van Ballen, B. 2010. Birds of Sumatra, Jawa, Bali and Kalimantan, RCB-LIPI and Birdlife Indonesia, Bogor.

Partasasmita, R., Iskandar, J., & Malone, N. 2016. Karangwangi people's (South Cianjur, West Java, Indonesia) local knowledge of species, forest utilization and wildlife conservation. Biodiversitas 17: 154-161.

Retnaningtyas, R.W., Hermadhiyanti, W., Rahayu, D.A., & Listyorini, D. 2015. The Identification of the White-Bellied Sea Eagle (*Haliaeetus leucogaster)* Based on Morphological Characteristics. The 3rd International Conference on Biological Science Volume 2 (2015) 588-591.

Wiwoho, J., Basuki, O.P., & Huda, R. 2007. Laporan Program Pelepasliaran Elang Laut Perut Putih (*Haliaeetus leucogaster*) di Kawasan Danau Batur. Bali: Pusat Penyelamatan Satwa Bali.